Aid Effectiveness in the Small Island Developing States of the South Pacific

June 2009

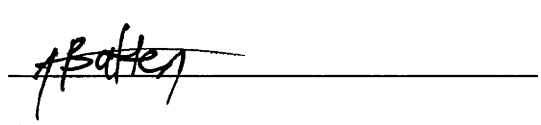
Aaron Batten
Crawford School of Economics and Government
Australian National University

A thesis submitted for the degree of Doctor of Philosophy of The Australian National University.

JEL: O23, O56, F35

Declaration

I declare that this thesis is my own work and has not been submitted in any form for another degree or diploma at any university or other institute of tertiary education. The main text, not including appendices, comprises 64,110 words. Where information has been obtained from other publications of my own, published both individually and jointly, appropriate referencing has been given. All other information obtained from the published and unpublished work of other authors has been acknowledged in the text, and a full list of references is given.



Aaron Batten
June 25, 2009

Acknowledgements

A number of people have made significant contributions to this thesis, directly and indirectly. Foremost thanks go to my supervisor Professor Satish Chand for encouraging me to leave paid employment in pursuit of further study. Your knowledge and passion for researching the South Pacific was made all the more infectious by giving me the freedom to pursue my own research interests whilst also knowing when to steer me in the right direction. Your tireless efforts at reviewing and commenting on my work are very much appreciated.

Also central in my decision to continue studying was Emeritus Professor Peter Drysdale. Traveling with you on numerous occasions throughout North and Southeast Asia was an eye opening experience on what the power of ideas, organisation and a little Cognac can achieve. Your guidance over my dissertation and emphasis on how to convey its messages are also very much appreciated.

A number of other people also contributed to this work. Dr Shiro Armstrong provided useful comments on a number of chapters and provided an extremely useful sounding board for ideas, as did Dr Damien Riwoe and Dr Stephen Howes. Tanvi Mehta provided valuable editorial assistance. I would like to thank the Australian Agency for International Development (AusAID) who contributed to the funding of my scholarship. I would also like to thank participants at various ANU Seminar Series presentations for their comments on a number of the chapters as well as staff at the Department of Treasury who attended presentations outlining my research during the early part of my candidature.

I extend my sincere gratitude to Dr Thomas Webster for allowing me to be a Research Associate at the National Research Institute (NRI) in Port Moresby for the final 18 months of my study, and to Ms Linda Duncan for welcoming me into the Economic Studies Division. Whilst I feel as though I have only just scratched the surface of understanding how this fascinating country works, being based at NRI has taught me more about PNG's wonderful people than an endless amount of study could achieve.

A warm thanks also goes to the attendees at the various seminars I held in Port Moresby who gave valuable feedback about translating econometric evidence into practical policy solutions for improving the quality of foreign aid given to PNG. Access to much of the data used in the final three chapters was made possible with the help of Jason Harris at the PNG Department of Treasury, who arranged contact with key PNG bureaucrats within the department. Thank you for this assistance.

Finally to Jo, to whom I owe an immeasurable debt. You constantly brought my ideas back to the real world whilst your endless love, encouragement and support have motivated me more than I could have ever imagined. Coming to PNG with you has been the experience of a lifetime. Our next adventure awaits.

Abstract

Australia's desire to support the development of functioning and effective governments in the small island developing states of the South Pacific poses it with a number of unique challenges. Weak public sector capacity and limited institutional resources have amplified the costs of the bureaucratic burden of aid, limiting its overall effectiveness at improving government performance. Weak budgetary and financial management systems have also meant that aid flows have tended to replace rather than augment domestic resources. This has contributed to a state of aid dependency and meant that aid has been less effective at making improvements in key welfare outcomes such as health, education and infrastructure.

This dissertation finds that foreign aid has had a positive impact on government effectiveness but this effect is shown to decline as recipients decrease in population size. This effect is particularly pronounced within the Australian aid program, reflecting the large portion of its aid given to small island developing states. A Papua New Guinea case study then analyses how aid has impacted on the recipients bureaucratic and government behaviour. Aid is shown to have eroded the government's incentive to collect domestic revenue. Aid has also failed to support improved sectoral expenditure outcomes because successive governments have treated it as being highly fungible across sectors. In many instances, aid intended for key development sectors has simply replaced domestic resources. Finally, aid, and in particular technical assistance, is shown to have reduced the efficiency of the domestic bureaucracy in being able to translate public sector expenditures into improved social welfare outcomes. Australia's growing concern over the stability and security of the region indicate that new delivery approaches are required which try and circumvent many of these adverse effects of aid. A number of policy options are offered in the concluding section.

Table of Contents

List of Tables and Charts

List of Abbreviations

Accra Agenda for Action (AAA)
Advisory Support Facility (ASF)
Akaike Information Criterion (AIC)
Asian Development Bank (ADB)
Australian Agency for International Development (AusAID)
Australian Council for International Development (ACFID)
Australian Development Assistance Agency (ADAA)
Australian Development Assistance Bureau (ADAB)
Bougainville Copper Limited (BCL)
Bougainville Revolutionary Army (BRA)
Consumer Price Index (CPI)
Country Policy and Institutional Assessment (CPIA)
Cumulative Impulse Response Function (CIRF)
Development Assistance Committee (DAC)
Direction of Trade (DoT)
Enhanced Cooperation Program (ECP)
Fiscal Response Model (FRM)
Generalised Method of Moments (GMM)
Gross Domestic Product (GDP)
Gross National Income (GNI)
Hannan-Quinn Information Criteria (HQIC)
Impulse Response Function (IRF)
International Development Association (IDA)
International Financial Statistics (IFS)
International Monetary Fund (IMF)
Millennium Challenge Account (MCA)
Official Development Assistance (ODA)
Ordinary Least Squares (OLS)
Organisation for Economic Cooperation and Development (OECD)
Pacific Regional Information System (PRISM)
Papua New Guinea (PNG)
Penn World Tables (PWT)
Regional Assistance Mission to the Solomon Islands (RAMSI)
Small Island Developing States (SIDS)
Strongim Govman Program (SGP)
Structural Adjustment Program (SAP)
Two Stage Least Squares (2SLS)
UN Mission to East Timor (UNMISET)
United Nations (UN)
Vector Autoregressive (VAR)
Vector Error Correction Model (VECM)
World Development Indicators (WDI)

Chapter 1: Introduction

1.1 Overview

1.1.1 The Question

The central questions which this study seeks to address are what are Australia's motivations in giving aid to the small island developing states (SIDS) of the South Pacific and how has this aid impacted the performance of recipient governments in these countries. In particular, why have Australia's efforts to establish functioning and effective states within the region not been more effective?

1.1.2 The Thesis

This thesis argues that Australia's desire to support the development of functioning and effective governments in the SIDS of the South Pacific poses it with a number of unique challenges. Low public sector capacity and limited institutional resources in recipient countries have amplified the costs of the bureaucratic burden of aid, limiting its overall effectiveness in improving government performance. The weak budgetary and financial management systems present within most SIDS of the South Pacific have also contributed to aid flows being poorly managed. In many cases this has meant that aid flows have replaced rather than augmented domestic resources. These factors have contributed to a state of perpetual aid dependency and meant that aid has been less effective at making improvements in key welfare outcomes such as health, education and infrastructure.

1.1.3 The Method

To investigate these claims this study adopts a variety of methods. Firstly, it evaluates Australia's motivations for choosing to now give almost half of its aid program to SIDS– and what implications these motivations have had on the aid programs ability to pursue positive development outcomes in the region. This study then draws on cross-country evidence to determine how global efforts to improve government effectiveness have been impacted by the size of recipient countries. This global analysis is compared against evidence of Australian efforts to achieve these outcomes. Cross-country evidence is then augmented with a SIDS case study, Papua New Guinea (PNG). The case study investigates a number of aspects of how aid interacts with domestic financial management to impact on its effectiveness at achieving improved fiscal and social outcomes. In the first instance, this investigation examines how aid has impacted aggregate fiscal policy settings. The study then analyses the ability of aid to improve sectoral expenditure outputs and finally concentrates on the impact of aid on the PNG Government's ability to translate these expenditures into improved social welfare outcomes.

1.1.4 The Conclusion

In general, aid is shown to have a positive impact on government effectiveness but this effect is shown to decline as recipients decrease in population size. These effects are particularly pronounced for the Australian aid program, reflecting the large portion of its aid given to SIDS. For the PNG case study, aid is shown to have eroded the government's incentive to collect domestic revenue. Aid has also failed to support improved sectoral expenditure outcomes because successive governments have treated it as being highly fungible across sectors. In most instances aid intended for key development sectors has largely replaced domestic resources. Finally, aid, and in particular technical assistance, is shown to have reduced the efficiency of the domestic bureaucracy in being able to translate public sector expenditures into improved social welfare outcomes. Australia's growing concern over the stability and security of the region indicate that new delivery approaches are required which try and circumvent many of these adverse effects of aid. A number of policy prescriptions are offered in the concluding section.

1.2 Background

1.2.1 Small Island Developing States of the South Pacific

The countries of the South Pacific are diverse. Of the 14 which are members of the Pacific Islands Forum, PNG is the largest with a population of 6 million and land mass of 460,000 square kilometres. In contrast, Niue has the smallest population of the region's numerous microstates with 2,000 residents, whilst Nauru has the smallest land mass covering just 21 square kilometres. All of these countries are, however, members of a group of 51 countries classified by the United Nations (UN) as SIDS.[1] Whilst no exact definition exists, membership of the SIDS network relies on each of these states sharing either some, or all, of a number of common characteristics relating to their low to middle income status, remoteness, low-lying coastal land mass, small populations, a lack of domestic resources, susceptibility to natural disasters as well as a number of common economic challenges which shall be discussed shortly (UN DESA 2008).

Whilst success in overcoming these challenges which face the SIDS of the South Pacific has varied, overall economic performance has been poor. Countries such as PNG, Solomon Islands and Nauru have all recorded long term declines in their per capita incomes since they each gained independence in 1975, 1978 and 1968 respectively. These countries have also made limited progress on social indicators. PNG and the Solomon

[1] A full list of these 51 SIDS and the members from the South Pacific is provided in Appendix 1.1.

Islands now have infant mortality rates more than twice as high as other countries in the region at 55 deaths per 1,000 births. PNG also has the worst educational statistics in the region with a 56 per cent gross enrolment rate for primary education in 2006 (World Bank 2008). More progress has been made in countries such as Vanuatu and Fiji which have, for example, reduced levels of infant mortality well below the lower to middle-income country average of 40 deaths per 1,000, with rates of 15 and 29 respectively. However, slow and volatile rates of growth have meant per capita income levels have increased only by an average 0.4 per cent per annum in Vanuatu and 0.5 per cent per annum in Fiji since 1980. Even the relatively successful Polynesian states such as Tonga and Samoa[2] are still heavily reliant on remittance and aid income, and face significant economic and social challenges (World Bank 2008) highlighted by the 2006 riots in the Tongan capital, Nuku'alofa.

Deteriorating governance and public service delivery have also contributed to a number of these countries now being classified as 'fragile' according to the World Bank's Country Policy and Institutional Assessment (CPIA). Officially this list includes Solomon Islands, PNG, Kiribati, Tonga and Vanuatu as they are all within the bottom two quintiles of the ranking system. However, many other countries in the region which the CPIA does not cover suffer from equally weak bureaucracies and poor governance environments (Feeny 2005a:1).

It is unsurprising then that the South Pacific region continues to make slow progress towards achieving the Millennium Development Goals (MDGs) espoused in the 2000 UN Millennium Declaration (UN 2000)[3], particularly in the areas of health, HIV and AIDS, water and sanitation, and educational outcomes. Indeed, as the 2008 UN MDG Monitoring Report highlights, 'of the five sub-regions of Asia-Pacific the success of Pacific Island developing countries in implementing the MDGs has been the least impressive' (UN 2008:12).

1.2.2 Economic Challenges of Small Island Developing States

The lack of economic development in the South Pacific highlights many of the unique economic challenges which a number of authors have shown face SIDS (Briguglio 1995;

[2] Both these countries have, for example, almost 100 per cent primary school enrolment and have more than halved their infant mortality rates over the last two decades to approximately 20 deaths per 1,000 births by 2006.

[3] The eight MDGs break down into 21 quantifiable targets that are measured by 60 indicators. These goals include Goal 1: Eradicate extreme poverty and hunger; Goal 2: Achieve universal primary education; Goal 3: Promote gender equality and empower women; Goal 4: Reduce child mortality; Goal 5: Improve maternal health; Goal 6: Combat HIV/AIDS, malaria and other diseases; Goal 7: Ensure environmental sustainability, and; Goal 8: Develop a Global Partnership for Development.

Streeton 1996; Armstrong et al. 1998; Armstrong and Read 2002; McGillivray et al. 2008). These authors highlight that whilst diverse in nature, SIDS tend to be categorised by undiversified production capacity due to a limited availability of domestic resources. Limited domestic production bases have made SIDS vulnerable to external and domestic shocks and they are highly dependent on imports for both consumption and investment goods. A reliance on volatile agricultural exports and resource extraction has also tended to make these countries vulnerable to trade imbalances and volatile foreign exchange reserves. Multiplying these effects is the frequency of natural disasters such as cyclones, floods and earthquakes, which have large detrimental effects on domestic economic activity and export revenues. A large reliance on foreign trade is also frequently undermined by higher than normal transportation costs as they are often in remote locations, with limited scale economies and generally have poor infrastructure.

Compounding the economic challenges of SIDS are also the unique pressures these states face in developing well-functioning bureaucracies. Farrugia (1993), for example, describes how in small states public sector managers are exposed to a much higher degree of conflicting pressures arising from close interpersonal relations, limited promotion opportunities and senior officials having to act in multifunctional roles. Streeton (1993) also illustrates how in small states it is often much more difficult to recruit and maintain high quality civil servants because of the limited supply of candidates available and the tendency of the most capable individuals to seek employment in larger markets.

Despite these challenges, SIDS are by no means destined for poor economic performance. Armstrong et al. (1998:654), for example, find that states with less than 3 million people are categorised by the full spectrum of economic success, varying from those 'with serious economic difficulties to some of the highest living standards in the world'. Likewise, Armstrong and Read (2002) find that even though small states are exposed to greater levels of economic volatility, numerous countries have been able to adopt policy settings which countervail these adverse effects and achieve significant economic success. These results are supported by Read (2007) who found that neither small size nor 'islandness' are significant barriers to attracting foreign capital inflows; rather, SIDS are constrained by trade policies and income levels. Easterly and Kraay (2000) even find that after controlling for location, small states actually outperform larger ones in terms of their productivity levels and economic performance.

These findings give reason for both hope—that the SIDS of the South Pacific are by no means condemned to poor economic performance—as well as concern—about why the region has consistently underperformed in recent decades. These findings also highlight that it has been government policy rather than economic circumstance which has determined the success or failure of countries in the South Pacific, and in SIDS more generally (Armstrong and Read 2002; Read 2007). This supports a more general consensus within the economic literature of the centrality of institutions and governance in determining economic performance (North 1990; North 1994; Acemoglu et al. 2001; Rodrik et al. 2004).

1.2.3 Australian Aid in the South Pacific

Australia continues to be the largest aid donor in the South Pacific, and has been central in the high levels of per capita financial support received by the region, and in particular to Melanesia.[4] In terms of total aid receipts since 1974, Australian aid has accounted for 89 per cent of Nauru's, 87 per cent of PNG's, 38 per cent of the Solomon Islands', 34 per cent of Tonga's, 33 per cent of Fiji's, 27 per cent of Samoa's and 21 per cent of Vanuatu's (OECD DAC 2008).

PNG in particular has remained the centrepiece of the Australian aid program, receiving 61 per cent of total Australian aid flow since 1974 (OECD DAC 2008). Other major recipients in the region have included Solomon Islands, Fiji, Vanuatu and Nauru, which have received 4.1 per cent, 3.2 per cent, 1.7 per cent and 0.5 per cent of Australian aid flows respectively. In total, 74 per cent of Australian aid was allocated to the South Pacific between 1974 and 2006.[5]

The poor economic performance of the region poses a number of difficult challenges for the Australian aid program in the South Pacific. In particular, whilst SIDS status appears not to condemn countries to economic stagnation, the continued lack of development success in the region despite large aid flows raises serious questions about the contribution this assistance has made to fostering functioning and effective states in these environments.

[4] Other major active donors in the region include the World Bank and the Asian Development Bank as well as other bilateral agencies from Japan, New Zealand, the European Union, the UK, and more recently, from China and Taiwan. For a full exposition of the high levels of per capita foreign aid received by Pacific Island countries see Table 3.1.

[5] For the purposes of these calculations, the South Pacific is defined as Cook Islands, Fiji, Kiribati, Marshall Islands, Nauru, PNG, Samoa, Solomon Islands, Tonga, Tuvalu and Vanuatu.

The subject of whether Australian aid has contributed or hindered the establishment of functioning and effective states within the region has remained a contentious issue over the last decade. Pavlov and Sugden (2006) and Feeny (2005a; 2005b), for example, argue that in the absence of aid, economic growth rates in the South Pacific would have been lower. On the other hand, authors such as Hughes (2003) and Hughes and Windybank (2005) have pointed to aid as being one of the very causes of the region's poor economic performance. In practice, however, establishing whether aid has fostered faster or slower rates of economic growth in the South Pacific has been of little practical policy importance. Even if one accepts *a priori* that aid has led to improvements in economic performance within the region, it is clear that aid has not been able to foster a level of state-functioning and economic prosperity which is both desired by the people of the South Pacific and, ultimately, is acceptable to Australia. From both an Australian and South Pacific perspective, maintaining the status quo of past performance is therefore undesirable.

What is also increasingly clear is that it is how aid interacts with the quality of governance and bureaucratic decision making that will ultimately determine its success or failure in being able to assist in the transformation of the region from an economic laggard to one with rising prosperity and widespread wealth creation (Chand 2006).

1.2.4 The Challenge of 'Scaling Up'

Australia's commitment to a substantial scaling up of its aid program both to the South Pacific and to other developing regions creates a heightened need to understand and address these challenges. Total Australian aid is forecast to increase from 0.3 per cent of gross national income (GNI) in 2007 to 0.5 per cent by 2015 (AusAID 2008). Increasing the impact of aid is, however, not simply related to increasing aid volumes. Donors have become increasingly aware about the conditions under which aid is likely to be absorbed less effectively by recipient countries. On the economic side, structural constraints such as skilled labour shortages, underdeveloped financial markets and infrastructure bottlenecks can all raise the marginal cost of aid, diverting limited domestic productive resources away from private sector activity (Bourguignon and Sundberg 2006:2).

Higher aid flows may also be undermined by governance and institutional constraints as additional resources have the potential to encourage higher levels of rent seeking and corrupt behaviour. Higher aid volumes can also impose larger costs on the capacity of the recipient bureaucracy to manage and plan for the use of the aid within its own fiscal frameworks (Heller 2005). This task is often amplified when the heavy reliance on external

assistance creates fiscal uncertainty in the recipient country, making long term expenditure planning more difficult (Heller and Gupta 2002:18).

It is for these reasons that the scaling up of the Australian aid program through the Australian Agency for International Development (AusAID) has been accompanied with a growing focus on improving its effectiveness. Following a number of major international conferences, Australia became a signatory to the Paris Declaration on Aid Effectiveness in March 2005 (OECD 2005), and most recently to the Accra Agenda for Action (AAA) in 2008 (AusAID 2009). These agreements commit the aid program to a range of activities associated with best practice aid delivery which seek to limit many of the adverse consequences of aid. This includes improving the coordination, implementation and accountability of its aid disbursements through such measures as aligning aid flows with recipient priorities, using local public financial systems, untying aid flows and making aid flows more predictable. Greater effort has also been made in implementing results orientated monitoring and evaluation frameworks which seek to identify weaknesses in existing programs and highlight productive delivery mechanisms (ODE 2006). These efforts also led to the establishment of the Office of Development Effectiveness (ODE) within AusAID in 2006 to monitor the quality and evaluate the impact of the Australian aid program as a means of identifying where effectiveness could be improved (ODE 2008a).

1.3 Policy Problems

1.3.1 Overview

The focus of Australian aid on improving the effectiveness of government bureaucracies within the SIDS of the South Pacific highlights the importance now placed on these institutions in delivering the range of public goods and policy choices that are required for a stable prosperous society. The following section discusses five key policy issues related to the effectiveness of Australian efforts to assist in strengthening these institutions. Each of these policy issues forms the basis for the analysis presented in the following chapters.

The first policy issue considers the motivations of Australia in giving aid and the impact that these motivations may have on the efficiency of foreign resource allocations. The second issue considers the impact of foreign aid on overall government effectiveness in SIDS environments. The final three policy issues consider how aid may interact with public sector behaviour and the domestic budget process to impact fiscal policy outcomes. As shall be explained, the budget process is emphasised because of the key role it plays in

achieving improved social outcomes. It is through the budget process that the government aggregates the diverse preferences of society, assesses the redistributive consequences of meeting these preferences and ultimately becomes accountable to its citizens for the quality of goods and services it is capable of providing. In particular, the third policy issue discusses the impact of foreign aid on aggregate fiscal discipline which supports macroeconomic stability and long term economic growth, by equating revenue sources with spending commitments. The fourth analyses the impact of aid on spending levels in productive sectors of the economy which facilitate an expansion of both human and physical capital. The final policy issue discusses the role of aid in improving the value for money of these expenditure allocations in terms of maximising their impact on the chosen social outcomes for which they have been designated.

These policy problems are considered in turn, in each of the subsequent chapters. Each of the chapters has its own conclusions and policy implications. Chapter 8 concludes and brings a number of the core lessons from each of these chapters together to offer some broad policy proposals for how Australia may leverage greater gains from its assistance efforts in the SIDS of the South Pacific, and, in particular, in PNG.

1.3.2 The Arc of Instability and Australian Aid Allocation

The first step in this analysis is to determine why Australia gives aid to the SIDS of the South Pacific and the implications that these motivations have had for its approach in assisting the region. Australian perceptions of the South Pacific have varied greatly across the post colonial period. Once seen as an under-performing yet basically benign region, today the SIDS of the South Pacific are described as an 'arc of instability' (Dibb 2000; Duncan and Chand 2002), a region of weak and failing states prone to illegal activity (Reilly 2000), and even a potential haven for international terrorists (ASPI 2003). New international security concerns following terrorist attacks in the United States and Bali have amplified Australia's anxiety about the economic sustainability and stability of the region (ASPI 2004).

Australia's concern over the proximity of troubled South Pacific states highlights the continued importance that it has placed on using the aid program as a means of pursuing its own strategic and security interests—in addition to humanitarian objectives. Indeed, establishing regional stability and security has continued to be a unifying theme of the aid program as it has undertaken its mandate of 'advancing Australia's national interest by

assisting developing countries to reduce poverty and achieve sustainable development' (AusAID 2005a:8).[6]

The principal justification for the pursuit of these dual objectives within the aid program has been that they are in fact complementary. Promoting functioning and effective states and economic growth in the South Pacific is beneficial not only to the Pacific but also to Australia (AusAID 2006, Downer 2007). Whether these multiple objectives have had adverse effects on the ability of the aid program to achieve large scale reductions of poverty in the region has, however, been a subject of debate. For example, a major review of the Australian aid program in 1996, the Simons Review, argued that the pursuit of commercial, political and security objectives by the aid program had resulted in high cost, high profile projects but without any clear analysis of benefit to low income populations (Mullen 1999:33). As a result, it proposed the Australian aid program needed to develop a clearer strategic vision which assisted developing countries to reduce poverty through sustainable economic and social development (Simons 1997).

Similarly, Davis (2002:101) argued that the Australian foreign aid program has failed to live up to its potential because the Australian Department of Foreign Affairs and Trade, and its pursuit of Australia's national interest, have dominated policymaking about high level aid.[7] The Australian Council for International Development (ACFID) has also noted that Australia's foreign aid budget has been increasingly diverted to whole of government rather than purely developmental priorities, particularly with regard to national security, in turn limiting its ability to achieve positive development outcomes (Spillane 2004).[8]

This highlights the first set of policy problems considered in Chapter 2 of this study. It includes how Australia's national interest and development objectives have influenced its aid allocations in the region and more broadly. Furthermore, Chapter 2 will also consider whether Australia's growing strategic and security concerns about the South Pacific have

[6] One recent example of this national interest objective being implemented within the aid program has been the emphasis on cross-border issues such as support for customs procedures, border control, transnational crime initiatives, and counter-terrorism through the strengthening of law and justice sectors (AusAID 2003a).

[7] This situation has been perpetuated within successive governments by 'budgetary reporting structures, where national interest influences the criteria by which the Australian Parliament assesses the value of foreign aid' (Davis 2002:102).

[8] In a similar light Brown (2005:4) argues that, while important, the humanitarian objectives of aid in the South Pacific 'are secondary to a range of political, geo-strategic and economic objectives that influence aid policies. In other words, to a large extent, aid levels are…set at the political level, for political reasons and fluctuate in step with the political cycles of donor countries.'

influenced the responsiveness of its aid program to poverty vis-à-vis strategic priorities or whether the two objectives have indeed been mutually attainable.

1.3.3 Foreign Aid and Functioning and Effective States in SIDS

The evolving concerns and perceptions of the South Pacific have had a significant impact on the type of assistance Australia has delivered to the region. During the 1960s and 1970s the Australian Government adopted an essentially hands-off approach. This meant that a large portion of Australian aid was given either directly as government-to-government grants, mainly to PNG, or through the funding of specific projects predominately related to service delivery or national infrastructure. This reflected both a desire by post colonial Australia not to be seen as meddling in the domestic affairs of its South Pacific neighbours as well a strong sense of optimism surrounding the economic potential of these neighbours. During the following decades, a growing unease about the misuse of aid led to a progressive tightening of its conditionality and accountability mechanisms, and during the 1990s a phasing out of PNG's direct budget support was undertaken. Most recently, the increasing recognition of the threat of failed or failing states on its doorstep has led Australia to adopt a more interventionist approach towards improving institutional performance in the region (Chand 2004; Dinnen 2004; AusAID 2007).

Examples of this interventionist approach have included the Australian-led multinational peace-enforcement missions under the UN Mission to East Timor (UNMISET) in 2002 and the Regional Assistance Mission to the Solomon Islands (RAMSI) in 2003 to restore peace and then rebuild government with a substantial institutional support program. In addition, the PNG Enhanced Cooperation Program (ECP) in 2004 deployed up to 80 Australian Government officials as specialist advisers into the PNG bureaucracy.[9] A similar, but much smaller, program of Australian officials was also initiated with Nauru in 2001.[10] This new interventionist stance by Australia in the region stands in sharp contrast to the essentially hands-off approach of recent decades.

---

[9] This intervention also included up to 230 Australian Federal Police however this component of the deployment was scaled back following the successful legal challenge over the constitutionality of prosecutorial immunity by the deployed Australian police and bureaucratic officers.

[10] Callick (2003:1) notes that several factors have contributed to the shift in Australia's aid policy to the region including: the successful military operation in East Timor in 1999; the success of the (unarmed) Peace Monitoring Mission in Bougainville in 2000; media coverage of arguments for a more pro-active policy in the region generally and in the Solomon Islands particularly; the 'coalition of the willing' interventions model used elsewhere, most importantly in Iraq; and a concern that without intervention now, state services in the Solomon Islands in particular could collapse completely.

Sustained high levels of foreign financial assistance combined with poor economic performance have led to a number of criticisms regarding the contribution of Australian aid to the improvement of government performance within the region. In particular, aid flows have been associated with the encouragement of rent-seeking behaviour as domestic politicians seek to access donor resources whilst resisting any attempts at the imposition of conditions on the usage of those resources via accusations of neo-colonialism (Windybank and Manning 2003:2; Dinnen 2004:5).[11] Aid flows have also been associated with perpetuating poorly performing governments in the region by subsidising the costs of inefficient economic policies and oversized public bureaucracies. This in turn has delayed the need for any wide-scale economic reforms in the region, contributing to a minimal relationship between aid flows and economic performance (Duncan 1994; Chand 2004). It was these types of criticisms which even prompted authors such as Hughes (2003) to suggest that 'aid has failed the Pacific', undermining the effectiveness of government by promoting irresponsible and unaccountable policies.[12]

This set of issues is considered in Chapter 3 of this study. The analysis compares global cross-country evidence on the impact of foreign aid on the effectiveness of recipient governments against Australian efforts to achieve these outcomes. In particular, it also seeks to determine whether these efforts have been impacted on by the unique economic characteristics associated with the small size of countries within the South Pacific.

1.3.4 Foreign Aid and Fiscal Aggregates in PNG

One of the most important bureaucratic and administrative activities required for the establishment of functioning and effective governments is the budget process and the fiscal policy outcomes that this creates (Gupta et al. 2004). At the aggregate level this involves the mobilisation and management of both domestic and foreign resources, which in turn impact upon macroeconomic stability. Fiscal policy also determines the quantity and quality of productive investments made in crucial economic development sectors such as social services and infrastructure.

---

[11] Windybank and Manning (2003:2), for example, claim that in PNG 'generous levels of foreign aid have created "windfall" incomes (economic rents) that have led to waste and corruption. Rent-seeking has subsidised the rise of a small political elite and overblown central government at the expense of investment in infrastructure and diversification of the economy.'

[12] These types of arguments also coincide with Svensson's (2000) seminal study. He argues that windfalls of foreign aid are on average associated with more extensive corruption. The author also finds that these effects tend to be particularly pronounced in countries which have weak public-sector capacity and a divided policy process—characteristics which are typical of many of the SIDS of the South Pacific.

The high levels of per capita assistance received by the SIDS of the South Pacific means that foreign financial resources have constituted, and continue to constitute, an integral part of their total fiscal resources[13]. However, continued weak public-sector expenditure management and poor allocation of domestic resources have led to criticisms that this assistance has provided incentives for these governments to adopt adverse behaviours and poor fiscal policies.

There are a number of ways in which foreign aid may encourage adverse fiscal behaviour from a recipient government. Bauer (1966; 1971) was one of the first to argue that continued high levels of financial assistance weaken the economic and social management responsibilities of a government. A lack of accountability to domestic constituents can then lead to a weakening of budgetary and revenue institutions, which results in poor expenditure control, and poor quality public investment such as low levels of financing for development oriented activities like health and education (Moss et al. 2006:10).

The delivery of aid has also been associated with the undermining of a government's incentive to expand domestic revenue collection as it finds it easier and more politically appealing to extract resources from donors than to increase taxes on its constituents (Brautigam and Knack 2004; Mwenda 2006:4). This has the potential to not only deplete domestically generated resources but create a dependency on continued aid flows and donor assistance which can support rent-seeking behaviour by the recipient government (Easterly 2002; Easterly 2003). The potential for continuous financial bail-outs from donor organisations has also been associated with the moral hazard of encouraging less responsible debt management and lower levels of public savings (Franco-Rodreiguez et al. 1998).

Weak public sector bureaucracies, poor accountability mechanisms for government and limited staff capacity potentially make the SIDS of the South Pacific particularly susceptible to many of these adverse fiscal effects of aid. Collier and Chauvet (2008), for example, survey the available evidence on the impact of foreign aid on economic reform in poor governance environments, including two countries from the South Pacific—PNG and the Solomon Islands. Here, the authors argue, financial aid has favoured the ruling elite by postponing necessary structural and microeconomic reforms as it is less inclined to

[13] For a full exposition of the high levels of per capita foreign aid received by Pacific Island countries see Table 3.1.

antagonise key political and business allies by reining in anti-competitive business legislation or expanding tax collection in lieu of the continued receipt of foreign resources.

PNG in particular offers an insightful case study in this regard. Despite being the largest economy and closest to major international trading routes, the PNG business environment has continued to be amongst the most expensive, least investment-friendly in the region (Batten et al. 2009).[14] Moreover, despite receiving very high levels of direct budget support from Australia in the decades following its independence, PNG's fiscal policy was characterised by persistent deficit financing and growing public debt. Windybank and Manning (2003:12) concluded that sustained financial assistance from Australia encouraged successive governments in PNG to 'live beyond their means, encouraging irresponsible policies and postponing the need for reform'. Criticism over the fiscal effects of aid in PNG has also focused on the diversion of aid funds from productive investments to consumption activities (Hughes 2003:25). In particular, aid flows are commonly believed to have contributed to a bloated public sector as freed up domestic resources are transferred away from aid-financed sectors (Tulip 2005:1).

Following a historical analysis of the interaction between foreign aid and PNG's fiscal policy since its independence in Chapter 4, this set of issues is analysed in Chapter 5, using PNG as a case study. The analysis includes an assessment of how the PNG Government has reacted to inflows of foreign financial resources to influence aggregate fiscal outcomes. This includes determining whether foreign grants have undermined the PNG Government's incentive to collect domestic revenue and also whether they have encouraged less responsible debt management behaviour. In addition, this chapter considers whether the delivery of foreign aid has led to an increase in the development orientation of government expenditures in PNG, or whether widespread diversion taken place towards non development priorities?

1.3.5 Foreign Aid and Sectoral Expenditures in PNG

Switching from untied budget support to earmarking aid funds to the delivery of specific activities through project and program aid has been a key method used by Australia to try and improve the development impact of its assistance to PNG. As Feeny (2003:91) notes, '[t]he Australian policy of phasing out aid provided as budget support in favour of project aid has ensured that aid is now used for important projects in the health and education

[14] As Batten et al. (2009) highlight, this environment exists because successive governments have continued to pursue policies granting favourable tax concessions, monopoly and anti-competitive trading rights, and trade barriers to numerous domestic industries.

sectors.' A problem with this suggestion, however, is that it ignores the ability of the recipient government to alter its own spending habits in response to foreign financial assistance to certain sectors of the economy. In practice, the response of aid recipients may subvert attempts of the aid donor to increase investment in certain productive sectors of the economy as recipient governments channel their own resources to other less productive, but politically beneficial, expenditure items. In essence, this argument highlights that foreign aid is fungible.

To the extent that foreign aid provides additional resources for recipient governments, either directly through budget support or indirectly through fungibility, its effectiveness at increasing the quantity of resources available within any specific sector will depend most heavily on how the recipient government's fiscal behaviour responds to this support.[15]

Once again, PNG offers an insightful case study in this regard. At independence, PNG received very high levels of foreign aid in the form of direct budget support. Growing criticisms about the domestic government's usage of these funds, however, led to the gradual introduction of project and program aid throughout the 1990s. By 2001, budget support had been completely removed, with all grant aid being delivered through specific project and program funding mechanisms.

As explained in Chapter 4 however, despite these changing aid modalities, sectoral expenditure outcomes in PNG have not improved and have in many cases worsened since the introduction of project and program aid. These views were expressed by AusAID (2003a:27) which highlighted that 'analysis of the PNG Government's own funding for different sectors confirms that government funding for key sectors such as infrastructure, health and education was higher when PNG was receiving budget support than in more recent times.'

This set of issues is considered in Chapter 6, building further on the PNG case study. The analysis includes what impact foreign aid has had on total funding levels for three core service delivery priorities—health, education and infrastructure—in relation to the funding of general government consumption expenditure. Another important relationship which is

[15] As highlighted in McGillivray and Ouattara (2005:248), it is essential to recognise that 'aid is given primarily to the government and therefore any macroeconomic impact will depend on public sector fiscal behaviour'. In this sense, the ability of foreign aid to promote higher rates of economic development and in providing additional investment resources depends first and foremost on the response it elicits from the recipient government.

considered is the extent to which the shift from general budget support to sector allocated project and program aid has improved aggregate expenditure levels in each of these three key service delivery sectors.

1.3.6 Technical Assistance and Public Sector Efficiency in PNG

In addition to understanding the impact of aid on the overall effectiveness of government and its expenditure priorities, donors are also becoming increasingly focused on the impact that their assistance has on the efficiency of public spending to achieve improvements in social outcomes. At the 18th Australia–Papua New Guinea Ministerial Forum in Madang on 23 April 2008, ministers from both countries agreed to the continued placement of approximately 40 Australian government officials in PNG Government departments and agencies. This assistance package, now renamed from the ECP to the Strongim Gavman Program (SGP), is aimed specifically at strengthening the performance and capacity of central government agencies to improve their ability to deliver essential public services and infrastructure. This placement of Australian government officials in PNG's bureaucracy complements the pre-existing AusAID-run Advisory Support Facility (ASF). The ASF recruits international consultants to work in a range of agencies across PNG's public sector, also with the central goal of enhancing skills and building capacity within the host agency (AusAID 2007:12-20).

Following criticism that this technical assistance had become too focused on Port Moresby and was having limited impact on the lives of the rural majority, AusAID has also focused on linking technical assistance to improved levels of service delivery at the provincial and local level. This resulted in the implementation of the Sub National Strategy (SNS) in 2006 which provided A$100 million over four years to improve public administration and governance and to strengthen service delivery at sub-national levels of the government.[16]

The expansion and increasing diversification of Australia's efforts to improve the functioning of PNG's bureaucracy have contributed to it now delivering just over half of its total foreign aid to PNG in the form of technical assistance (OECD DAC 2008, ODE 2008b:32). Such a high level of technical assistance raises a number of important issues for Australian aid delivery in PNG. Studies such as those by Brautigam (1999:41) argue that in weak public sector environments, technical assistance can actually delay bureaucratic or economic reform by allowing the recipient government to continue delivering a base level

[16] This has included the placement of co-located AusAID officers within the Central Province, East New Britain and Eastern Highlands Province and in the Autonomous Bougainville Government.

of social services required to maintain its political position.[17] Chauvet and Collier (2004) also highlight that in fragile states such as PNG technical assistance has been an ineffective mechanism for encouraging greater levels of economic or bureaucratic reform. Indeed, the authors argue that in the absence of a demand for reform, technical assistance is unlikely to be of any use at all.

These types of limitations have been receiving growing acknowledgement in PNG. The Organisation for Economic Co-operation and Development (OECD; 2005:95) argued that the high levels of technical assistance provided by Australia had the potential to undermine rather than support capacity-building efforts and greatly reduced levels of domestic ownership of the development program. Former PNG Prime Minister and now Parliamentary Opposition Leader Sir Mekere Morauta has also voiced his concerns over Australian technical assistance. Responding to a March 2008 visit by Australian Prime Minister Kevin Rudd, he claimed that '[h]undreds of millions have been spent or are being spent on capacity building, but nothing really has eventuated' (Marshall 2008:1).

AusAID itself is perhaps the body most acutely aware of the challenges it faces in trying to improve the function and efficiency of PNG's public sector in providing improved service delivery. ODE (2008c:21) for example highlights that programs such as SGP which have traditionally been heavily focused on the 'doing' component of their role need to be more conscious of the capacity-building imperative to impart sustainable improvements to their counterpart agencies. In particular, deployed officers need to limit the cycle of dependency which can be created as they often find it easier to, perhaps due to time pressure, complete tasks themselves rather than letting locals take the lead.

In a recent review of PNG's health sector support, the ODE also states that high levels of technical assistance have had the potential to create significant problems, particularly in fragile states such as PNG where 'the high volume of support personnel and the enthusiasm they have brought has resulted, at national level, in a perception that...there has been too much technical assistance, resulting in at best duplication of effort, and at worst, suppression of activity' (ODE 2008b:32).

[17] This situation can then reduce the desire of the recipient government to reform and, in particular, reduce its incentive to discontinue using public sector employment as a means of generating political patronage.

This set of issues is analysed in Chapter 7. Using the PNG health sector as a case study, the analysis measures the impact which foreign aid, and in particular technical assistance, has had on the effectiveness of public spending allocations to improve outcomes for a range of health indicators after PNG's independence.

Chapter 2: Australian Aid—What Determines its Allocation?

2.1 Introduction

2.1.1 Overview

This chapter analyses both the determinants of Australian aid allocations and how these determinants have changed over time. In particular, the analysis focuses on the competing influence of both humanitarian and national interest objectives and whether Australia's growing awareness of national interest priorities in the South Pacific has led to a diversion of funds away from those countries which have the greatest humanitarian need.

This chapter also seeks to establish what have been the key determinants for Australia's growing focus on delivering aid through technical assistance. In 2005, Australia disbursed 45 per cent of its Official Development Assistance (ODA) in the form of technical assistance, the highest per cent out of all bilateral donors within the OECD (OECD DAC 2008). By 2007, this proportion had increased to 51 per cent (OECD DAC 2008). Regional security concerns, anti-corruption, and the growing focus placed on improving governance as a means of ensuring positive humanitarian outcomes have all been used as justifications for technical assistance now playing such a large role in the Australian program. This chapter seeks to determine which of these factors, or any others, have been most influential in this shift in Australian aid policy.

The chapter is organised as follows. Section 2.1.2 provides a historical overview of the changing motivations and patterns of Australian aid allocation following a number of major government reviews of its objectives. Section 2.2 provides a review of the literature assessing the motivations of global and Australian aid allocation. Section 2.3 develops a bilateral aid allocation model for Australian aid. Section 2.4 gives the empirical model and examines a number of estimation issues. Section 2.5 provides an overview of the data and Section 2.6 presents the estimation results. Section 2.7 concludes and discusses some policy implications of the results.

2.1.2 History of the Australian Aid Program

The Australian aid program has undergone a number of significant changes in size, focus and administration in the post World War Two era. Following the War the program focused on a government grant system to the Australian-administered territory of PNG. This assistance soon expanded in the late 1940s to other developing British Commonwealth countries such as India. From the early 1950s, aid allocation decisions were increasingly influenced by other foreign policy concerns, particularly with the

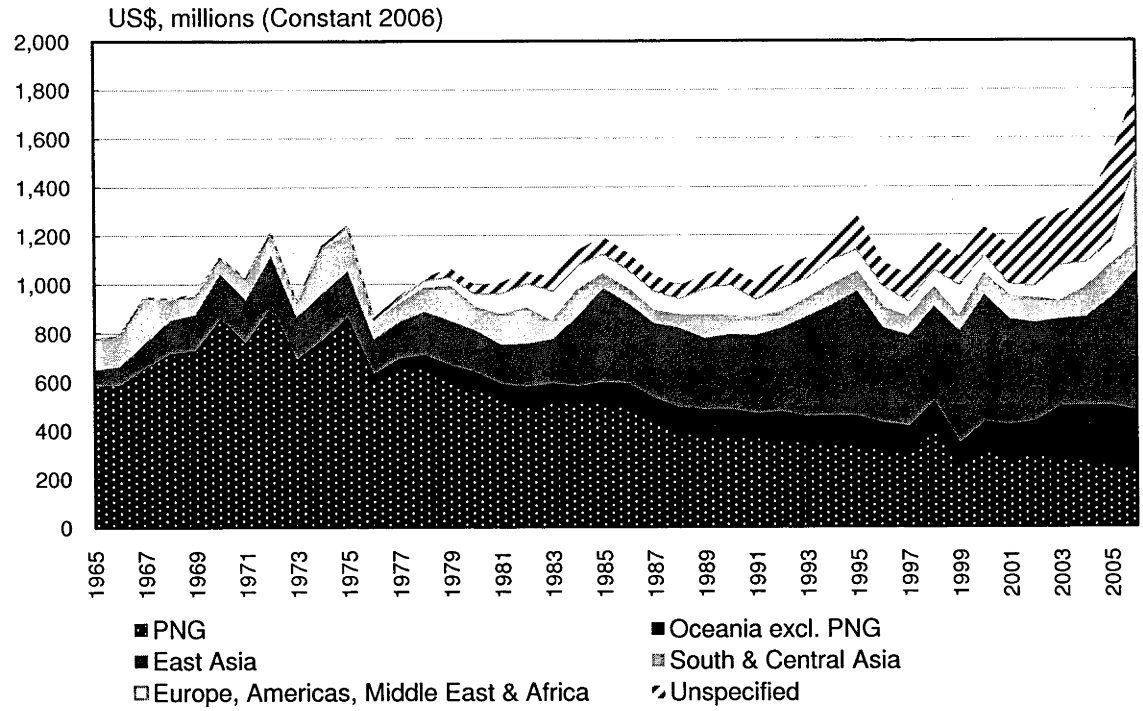
commencement of the Colombo Plan which was launched by the British Commonwealth to provide assistance to countries in South and Southeast Asia (Lowe 2005:392). Under this Plan, Australia expanded its range of assistance to target human capital accumulation, including programs such as scholarships, technical training facilities and advisory services for recipient governments (ABS 2001).

PNG continued to dominate Australia's aid program throughout the 1960s, receiving about two-thirds of Australia's foreign assistance (OECD DAC 2008). The period also saw Southeast Asia gradually gain more importance than South Asia, with Indonesia overtaking India as the second largest recipient of Australian aid (Chart 2.1) (Lowe 2005). Reflecting the growing size of the aid program, Australia created the Australian Development Assistance Agency (ADAA) in 1974, bringing together a range of programs which at the time were being carried out across the Australian public sector.[18]

The first major assessment of the Australian aid program was then conducted by the Jackson Review in 1984 (GoA 1984). Following a period of political disagreement regarding whether the objectives of the aid program should be motivated purely by humanitarian or self interest concerns, the Jackson Review argued that both should be included in the mandate of Australian aid. The Review justified this approach by arguing that the two objectives were in fact mutually attainable given that 'aid complements strategic, economic and foreign policy interests, and by helping developing countries to grow, it provides economic opportunities for Australia' (GoA 1984:3). The recommendations by the Review then led to the adoption of what came to be known as the 'triple mandate' of Australian aid—aid for commercial, diplomatic and humanitarian reasons (Cirillo 2006:35).

[18] In 1976 the Australian Government sought to amalgamate the ADAA into the Department of Foreign Affairs as a means of cutting administrative costs. However, the Agency remained independent following the Minister of State for Foreign Affairs, the Hon. Andrew Peacock, submitting a strong defence to Cabinet for the ADAA to remain a separate organisation. In this submission, the Minister argued that the removal of this independence would not only actually reduce its ability to have a 'long term foreign policy impact' but also 'raise doubts about our aid intentions among our neighbours and other donors' (GoA 1976).

Chart 2.1: Australian Aid Allocation by Region (1965–2006)



Source: OECD DAC (2008) and author's calculations.

The ADAA was subsequently renamed the Australian Development Assistance Bureau (ADAB) in 1987, which then evolved into AusAID in 1995. In 1996, the next major re-think of the aid program was completed under the Simons Review (GoA 1997a). This Review argued that the triple mandate of Australian aid had resulted in high cost, high profile projects without any clear analysis of benefit streams to low income populations (Mullen 1999:33). As a result, it proposed that the Australian aid program needed to develop a clearer strategic vision which should be 'to assist developing countries to reduce poverty through sustainable economic and social development' (GoA 1997a).[19]

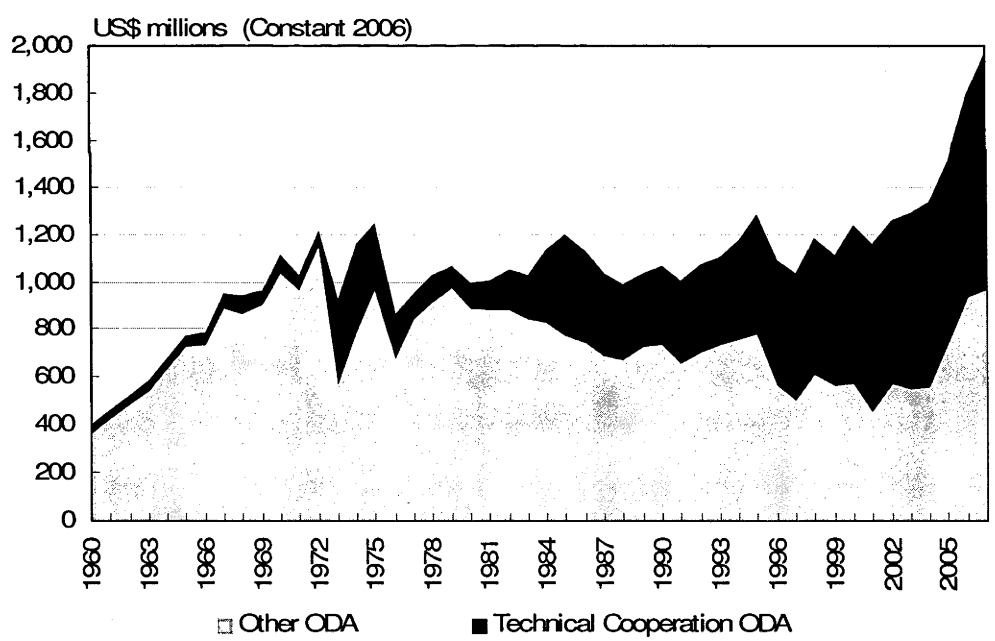
AusAID implemented a number of recommendations in the Simons Review, such as a more vigorous focus on defining strategic and program objectives as well as on allowing better performance measurement and reporting on aid quality. However, the mission statement of the organisation maintained its dual objectives of pursuing both national interest and poverty reduction objectives (GoA 1997b). Once again, the justification for this mission statement given by the Australian Government was that the two objectives were mutually achievable. As stated by the Australian Foreign Minister (1996–2007), the Hon. Alexander Downer, '[a]n effective and well-targeted aid program, focusing on the

[19] The Simons Review also reflected a growing desire by the government for a more vigorous focus on defining strategic and program objectives as well as on allowing better performance measurement and reporting on aid quality.

alleviation of poverty and the promotion of sustainable development, is clearly in the national interest. This view is even more relevant today as the links between regional development and Australia's national interest become increasingly intertwined' (Downer 2006:5).

The mid 1990s also saw a significant shift in focus of the aid program away from service delivery activities and towards improving bureaucratic and government performance in recipient countries (Cirillo 2006:40). One of the most significant consequences of this growing governance agenda has been the continued increase in the proportion of Australian aid given in the form of technical assistance. As can be seen in Chart 2.2, whilst technical cooperation had traditionally played only a minor role in the implementation of Australian aid policy, its significance began to expand gradually from the mid 1980s and into the 1990s. By 1996 the proportion of Australian aid given as technical assistance had reached approximately 40 per cent of total ODA disbursements, which by the early 2000s had reached 50 per cent.

Chart 2.2: Australian Grant Aid (1960–2005)



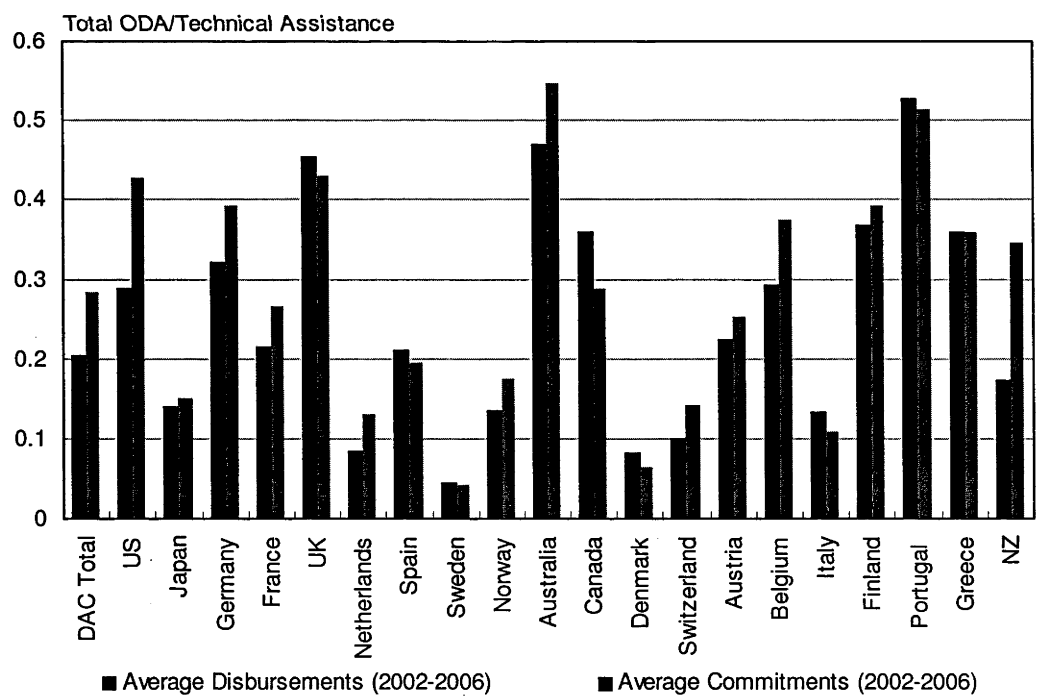
Source: OECD DAC (2008) and author's calculations.

This shift in aid policy also reflects a growing sense of political and economic instability in the region and recognition in Australia of the adverse consequences of failed or failing states on its doorstep (ASPI 2003; ASPI 2004). The scaling-up of the governance agenda through technical assistance was then pushed even further after the heightened security environment established by the terrorist attacks in the United States in 2001 and then Bali in 2002. This led to the belief that for a stable and prosperous region to emerge, Australia

must play a much more hands-on role in the facilitation of improved governance (Duncan and Chand 2002).

This hands-on, or interventionist, approach began in earnest in 2002 when Australia led a multinational peace-keeping force under UNMISET initially to quell violence following East Timor's independence from Indonesia and then to assist in the creation of state institutions. Following this, Australia led RAMSI in 2003, once again to restore peace following the escalation of domestic conflict and then to begin a process of rebuilding the Solomon Islands' weak state institutions. In 2005, Australia then deployed police and finance specialists to in-line positions in PNG's bureaucracy as a means of controlling public sector corruption and improving the performance of the national government under the ECP Agreement.[20] Likewise, a much smaller program of placing Australian officials in in-line positions was initiated with Nauru in 2001. As a result of these growing concerns over the establishment of functioning, effective and stable countries within its region, Australia now has amongst the highest proportion of its aid program delivered through technical assistance, and it is more than twice the average for members of the OECD DAC (Chart 2.3).

Chart 2.3: Proportion of ODA Disbursed as Technical Cooperation (2002–06)



Source: OECD DAC (2008). Note: Countries are listed in descending order according to the size of their total ODA. Technical Assistance is defined in Appendix 3.4.

[20] Notably, the police component of this deployment was scaled back following a successful legal challenge over the constitutionality of prosecutorial immunity by the deployed Australian police and bureaucratic officers.

The most recent major review of the aid program was the 2006 Australian Government White Paper (AusAID 2006). The White Paper reiterated the dual objectives of the Australian aid program whilst stressing the importance of the mutually serving interests which it seeks to achieve. This review also outlined the government's commitment to a scaling-up of aid, projected to double its 2004 level to reach A$4 billion annually by 2010 (AusAID 2006). Within this expanding aid budget, the White Paper outlined the growing desire by the Australian Government to implement what it saw as performance-based measures in the aid program. In particular, this included allocating additional aid to those countries which it saw as satisfying good governance criteria as a further means of promoting better bureaucratic and government performance in the region.

2.2 Literature Review

2.2.1 Past Studies

There exists a large body of literature assessing why donors give foreign aid. These studies have focused in particular on determining whether donors are motivated by recipient country need, or whether patterns of aid are determined by donors' own self interest. On the recipient need side, the analysis has sought to establish the relative explanatory power of measures such as per capita income or other welfare indicators such as child mortality or education levels against a variety of self interest variables related to colonial history, trade and investment connections as well as security interests such as military aid or arms transfers between two countries (some early examples of this literature include Montmarquette and Dudley 1976; McKinlay and Little 1977; Maizels and Nissanke 1984).

A core finding from this literature is that, in general, donors have been influenced by both types of motivations (ODI 2007).[21] Seminal studies such as the one by Alesina and Dollar (2000) also find, however, that donors tend to vary in their motivations, with multilateral aid being more heavily influenced by recipient need than bilateral agencies which tend to be motivated by self interest. In addition, some bilateral agencies generally perform better (for example, the UK, Netherlands, Sweden, Norway) than others (for example, US, France or Japan). These preferences have also been show to vary over time with authors such as Berthelemy and Tichet (2004) and Berthelemy (2006) showing that whilst still limited in its

[21] The earliest of this literature was produced by McKinlay and Little (1977; 1978; 1979), Montmarquette and Dudley (1976) and Maizels and Nissanke (1984). McKinlay and Little (1977; 1978; 1979) subsequently found that the United States had relied purely on strategic and political motivations to determine its aid allocations and humanitarian concerns had played an insignificant role. Likewise, Maizels and Nissanke (1984:891) concluded that five of the world's major aid donors—Britain, France, Germany, Japan and US—focused solely on political, strategic and economic motivations in determining how to allocate their aid.

influence on aid allocations, the needs focus of aid did begin to increase in the 1990s compared to the 1980s—a situation which the authors largely attribute to the declining strategic motivations of aid associated with the end of the Cold War.

McGillivray and Oczkowski (1991) were the first to study how foreign policy priorities influenced the distribution of Australian aid flows, focusing on the period 1980 to 1986. The authors develop a two-part modelling procedure to first estimate the decision over who receives foreign aid and then how much each recipient obtains.[22] In measuring both the humanitarian needs of the recipient and the commercial interests of the donor, the authors follow the broader literature on aid allocation.[23] To gauge strategic and political priorities, however, their paper justifies new indicators which measure whether a country is in a) the South Pacific b) Southeast Asia or c) a member of ASEAN. These measures are then said to reflect the strategic importance of these regions to Australia and its desire for influence in the ASEAN forum. The authors find that in addition to self interested commercial and strategic motivations, humanitarian concerns have played an important role in Australian aid allocations during this period.

Gounder (1994) then analysed Australian aid allocations between 1971 and 1992 utilising a nested modelling approach originally developed by Maizels and Nissanke (1984). This approach, which dominated the literature until recently, focused on the estimation of two separate aid allocation models. The first model explained aid allocation decisions based on the extent of the needs of recipients whilst the second estimated a separate equation with the inclusion of variables capturing the various dimensions of donor self interest. These two separate models of aid allocation were then compared against one another to determine which set of explanatory factors held the greatest sway in determining aid allocations.

Like McGillivray and Oczkowski (1991), Gounder (1994) includes dummy variables for whether a recipient country is from the South Pacific or Southeast Asia. However, in this

[22] The authors also control for extreme values of the allocation data, removing Australia's largest aid recipient PNG from the sample as well as setting a threshold of A$500,000 for a country to be included as a recipient. PNG is excluded largely because its special position as an ex-Australian territory meant that the decision process described for the aid allocation model was unlikely to match that which was used for determining levels of PNG support. The authors also argue that the majority of aid given to PNG was in the form of direct budget support, which is radically different to other recipients who mainly receive project aid (McGillivray and Oczkowski 1991:149).

[23] This includes per capita income, population levels and a dummy variable for whether the country is classified as a Least Developed Country (LDC), whilst the recipient's share of total Australian exports is used to measure commercial interests.

case, the variables are included as part of the recipient need specifications whilst Australia's strategic interests are measured by whether Australia gives military aid to a recipient country and if so how much.[24] Both models are then estimated to have a significant influence on the Australian Government's allocation decisions, supporting McGillivray and Oczkowski's (1991) results.

Following this, a number of studies began to consider the motivations of Australian aid to individual aid recipients to explore within-country as well as cross-country variations in allocation behaviour.[25] Gounder and Doessel (1997), for example, considered the determinants of Australian aid to Indonesia using time series data between 1978 and 1994. Using both Ordinary Least Squares (OLS) and time series methods to estimate two nested models representing recipient need and donor interest, the results again suggested that both concerns had been relevant to Australia's decisions about giving aid to Indonesia. Unlike Gounder (1994), however, in this case the authors also conducted tests where both models are combined into a single 'non nested' specification, revealing that the recipient need model dominated the donor interest. This, the authors argue, suggests a more significant role for altruistic motivations of Australian aid to Indonesia.

Using the same methodology and explanatory variables, Gounder (1999) and Gounder and Sen (1999) then consider the determinants of Australian aid to PNG and Indonesia between 1970 and 1995. In both cases, the nested modelling procedure reveals that both recipient need and donor interest have played a significant role in motivating Australian aid. In the PNG case, the non nested estimations also reveal, however, that the recipient need variables dominate donor interest as the primary motivating factor in Australian aid allocations.

McGillivray (2003a) then marked a turning point in the aid allocation literature, providing a synthesis of the potentially inaccurate methodologies adopted in many aid allocation papers, including those for Australia. The first point raised was the focus on comparing competing recipient need and donor interest models in much of the previous literature (as per Gounder and Doessel 1997; Gounder 1999; Gounder and Sen 1999). The problem was that if both the nested models were posited a priori to influence aid allocations, then each of the nested models must also suffer from omitted variable bias. McGillivray (2003a) also

[24] Other typical explanatory variables for donor interest are also included, such as investment flows between Australia and the recipient.

[25] This has helped to overcome the implicit assumption in purely cross-sectional studies that 'the observed relationship is homogenous across all countries in the regression' (Gounder 1999:237).

highlights the failure of 'the overwhelming majority of aid allocation studies' to take account of the truncated nature of the aid data in the estimation process, with many using inappropriate estimation techniques which have the potential to place a significant bias on the estimated coefficients (McGillivray 2003a:12).[26]

McGillivray and Feeny (2004) contributed further to the modelling approach of Australian aid, concentrating in particular on allocations made to PNG. This paper of theirs develops a 'concordance of mandates' approach, highlighting that aid allocation decisions to one country are jointly determined with decisions for all other recipients. The authors develop a system of simultaneous equations to control for the interdependency amongst the various allocation equations. Using data between 1968 and 1999, the paper finds in contrast to previous studies that both Australia and other major donors have allocated aid to PNG on the basis of need rather than self interest. The authors argue that this is a welcome result as increasing aid flows in response to humanitarian concerns is likely to have a larger 'growth payoff' than self interested aid flows.[27]

2.2.2 Research Gap

One limitation of recent assessments of Australian aid motivations has been the focus placed on aggregate estimates over time. Gounder (1999), for example, provides results which are aggregated between 1970 and 1996 and the results of Feeny and McGillivray (2004) are aggregated between 1969 and 1999.[28] As discussed, however, Australia, like other aid donors, has been motivated by a range of factors in the distribution of its aid program which have changed over time. What impact have these changing motivations had on the allocation priorities of the aid program? Are the critics' suggestions that the effectiveness of the Australian aid program has been compromised by its growing national interest priorities correct? Or has Australia managed to allocate aid on the basis of national interest without compromising its focus on humanitarian need?

---

[26] After discussing these issues, McGillivray (2003) then utilised a two-part sample selection model to estimate the motivations for US aid allocation for 96 developing countries and found that the shift towards development criteria as a motivation for donors has not been as large as calculated by the previous literature.

[27] One drawback of this approach is the requirement to estimate separate equations for each Australian aid recipient. Given the complexity of completing this exercise for all Australian aid recipients, the authors concentrate the model on the ten largest aid recipients and aggregate all other aid allocations into a residual estimation. The first 11 of these equations explain the allocation decisions of Australian and total aid to the largest recipients of Australian aid, whilst the 12th explains total aid flows to all other developing countries.

[28] Notably, Gounder (1994) does provide yearly results between 1969 and 1992. However, it only uses nested models of recipient need and donor interest which, as discussed, are likely to suffer from significant omitted variable bias.

Another important gap in the literature which this chapter seeks to address is to determine which factors have been responsible for Australia's growing shift towards delivering foreign aid through technical assistance. This question holds particular significance for Australia given that it now gives more aid in the form of technical assistance than any other major bilateral donor. As shall be shown, determining which factors have been responsible for changes in the composition as well as the volume of aid distributions gives important insights into the motivations of Australian aid.

2.3 A Model of Australian Aid Allocation

This chapter augments an aid allocation model of the type originally developed by Montmarquette and Dudley (1976) which, as discussed, has provided the foundation for much of the subsequent literature on non simultaneous estimation of aid allocation.[29] This approach hypothesises that the donor nation generates utility from consuming two separate goods—foreign aid (F) and other goods (X).

$$U = g(X, F) \tag{2.1}$$

where F_j is the consumption of foreign aid by the donor i in country j, so that F can be defined as the sum of expenditures from giving aid to n recipients.

$$F = \sum_{j=1}^{n} F_j \tag{2.2}$$

The utility obtained by Australia for giving a total amount of aid, $A_{j,t}$, to a recipient, j, at time t is then assumed to depend upon a number of factors relating to needs of the recipient ($R_{j,t}$), donor self interest such as commercial motivations ($I_{j,t}$) and colonial heritage (C_j). Australia's motivations for giving aid are, however, also intrinsically related to the geographic proximity of the numerous South Pacific states which make up the arc of instability. In order to capture the impact that the geographic proximity of these countries has on Australian aid allocation, an additional distance term, D_j, is also included in the utility function. In essence, this variable reflects the additional national interest which Australia derives from delivering aid to those countries which are geographically closer to itself after controlling for each of the other traditional determinants of aid flows. So Equation (2.2) can be re-written as:

[29] As discussed, Feeny and McGillivray (2004) extend the literature by modellinginter temporal Australian aid allocations by focusing on the bureaucratic decision-making process. Public servants in charge of the aid agency seek to maximise a utility function, where the utility obtained from giving aid to one country is jointly determined by the amount of aid that recipient receives from other aid donors. Given that this paper is concerned with aid allocation to *all* Australian aid recipients as well as all non Australian aid recipients, the methodology developed by Feeny and McGillivray (2004) would become excessively cumbersome should it be applied to this circumstance.

$$F = \sum_{t=1}^{T}\sum_{j=1}^{n} F_j = \sum_{t=1}^{T}\sum_{j=1}^{n} F(\overset{+}{R}_{j,t}, \overset{+}{I}_{j,t}, \overset{+}{C}_j, \overset{-}{D}_j).\overset{+}{A}_{j,t} \tag{2.3}$$

As indicated, the expected effects of marginal changes in each can be represented by:

$$\frac{\partial F}{\partial A_{j,t}} \geq 0; \frac{\partial F}{\partial R_{j,t}} \geq 0; \frac{\partial F}{\partial I_{i,t}} \geq 0; \frac{\partial F}{\partial C_{j,t}} \geq 0; \frac{\partial F}{\partial D_{j,t}} \leq 0 \tag{2.4}$$

Assuming the functional form of $g(.)$ follows the familiar Cobb-Douglas utility function, the utility generated by Australia from giving foreign aid to recipient j can be written as:

$$F_{j,t} = \sum_{t=1}^{T}\sum_{j=1}^{n} \frac{A_{j,t}^{\gamma} R_{j,t}^{\phi} I_{j,t}^{\rho} C_j^{\eta}}{D_j^{\tau}} \tag{2.5}$$

where for an interior solution the following parameters are constrained by:

$$0 \leq \gamma \leq 1;\ 0 \leq \varphi \leq 1;\ 0 \leq \rho \leq 1;\ 0 \leq \eta \leq 1; 0 \leq \tau \leq 1.$$

The Walrasian budget constraint of the donor for time t is given by:

$$Y = X + \sum_{j=1}^{n} p_j a_j \tag{2.6}$$

where p_j is the population of country j and a_j is the per capita aid receipt such that the decision by Australia to supply a_j dollars of foreign aid to country j can be found by solving:

$$\max_{a_j \in \Gamma(F)} g(X, F) \text{ s.t. (2.5) and (2.6)}$$

The Lagrangian can thus be written as:

$$\max \ell = g(X, F) + \lambda(Y - X - \sum_{t=1}^{T}\sum_{j=1}^{n} p_{j,t}^{\alpha} a_{j,t}^{\gamma}) \tag{2.7}$$

which gives the following first order conditions:

$$\frac{\partial \ell}{\partial X} = g_X - \lambda = 0 \tag{2.8}$$

$$\frac{\partial \ell}{\partial a_{j,t}} = \gamma p_{j,t}^{\alpha} a_{j,t}^{\gamma-1} R_{j,t}^{\phi} I_{j,t}^{\rho} C_j^{\eta} D_j^{-\tau} - \gamma\lambda p_{j,t}^{\alpha} a_{j,t}^{\gamma-1} = 0 \tag{2.9}$$

$$\frac{\partial \ell}{\partial \lambda} = Y - X - p_{j,t}^{\alpha} a_{j,t}^{\gamma} = 0 . \tag{2.10}$$

In this case, the Australian Government chooses a marginal rate of substitution between supplying foreign aid to a particular recipient and other goods by:

$$\frac{\gamma p_{j,t}^{\alpha} a_{j,t}^{\gamma-1} R_{j,t}^{\phi} I_{j,t}^{\rho} C_j^{\eta} D_j^{-\tau}}{g_x} = \frac{\gamma\lambda p_{j,t}^{\alpha} a_{j,t}^{\gamma-1}}{\lambda} \tag{2.11}$$

which solves to:

$$\frac{g_a}{g_X} = \gamma p_{j,t}^{\alpha} a_{j,t}^{\gamma-1} . \tag{2.12}$$

For a utility maximising allocation, Australia has a constant marginal rate of substitution between recipient countries, which is determined by:

$$a_{j,t} = \frac{\gamma}{\kappa} \cdot \left[\frac{p_{j,t}^{\alpha} R_{j,t}^{\varphi} I_{j,t}^{\rho} C_j^{\eta}}{D_j^{\tau}} \right]^{\frac{1}{1-\gamma}}$$

where κ is the price (opportunity cost) of Australia's decision to give foreign aid equal to $a_{j,t}$ to country j. For the purpose of estimation, total foreign aid ($A_{j,t}$) to country j is then given by:

$$a_{j,t} \cdot p_{j,t} = \frac{\gamma}{\kappa} \left[\frac{p_{j,t}^{\alpha} R_{j,t}^{\varphi} I_{j,t}^{\rho} C_j^{\eta}}{D_j^{\tau}} \right]^{\frac{1}{1-\gamma}} p_{j,t}$$

which solves to give:

$$A_{j,t} = \frac{\gamma}{\kappa} \cdot \left[\frac{p_{j,t}^{1+\alpha-\gamma} R_{j,t}^{\varphi} I_{j,t}^{\rho} C_j^{\eta}}{D_j^{\tau}} \right]^{\frac{1}{1-\gamma}} . \tag{2.13}$$

2.4 Estimation

2.4.1 The Empirical Model

Taking natural logarithms of Equation (2.13) to linearise the model gives:

$$\ln(A_{j,t}) = \beta_0 + \beta_1 \ln(p_{j,t}) + \beta_2 \ln(R_{j,t}) + \beta_3 \ln(I_{j,t}) + \beta_4 \ln(C_j) - \beta_5 \ln(D_j) + \sum_{s=1}^{h} \beta_s V_{j,t} + \varepsilon_{j,t} \quad (2.14)$$

where $\sum_{s=1}^{h} \beta_s$ is a vector of coefficients for time period dummies to be included in the pooled sample. Given Equations (2.13–2.14), the coefficients of the model can then be interpreted as:

$$\beta_0 = \ln(\frac{\gamma}{\kappa}) \quad \beta_1 = \frac{1+\alpha-\gamma}{1-\gamma} \quad \beta_2 = \frac{\varphi}{1-\gamma} \quad \beta_3 = \frac{\rho}{1-\gamma} \quad \beta_4 = \frac{\eta}{1-\gamma} \quad \beta_5 = \frac{-\tau}{\gamma-1}.$$

For $i = 1,...n$ and where $\varepsilon_{j,t}$ is an error term with $E(\varepsilon_{j,t}) = 0, \quad E(\varepsilon_{j,t})^2 = \sigma^2$ and the expected signs of the coefficients follow the hypothesis of the structural model presented in Equation (2.14).

2.4.2 Estimation Issues

A principal estimation issue involved in aid allocation studies is choosing which countries to include as part of the aid recipient sample. Some previous studies have selected only those countries which have received a positive value of Australian aid as their sample (for example, Gounder 1994). This approach does, however, exclude a significant amount of important information from the model. Australia's decision not to allocate aid to a particular country may be just as informative as its decision to allocate aid to another. Estimating this type of model with OLS or dynamic estimation procedures also truncates the error term of the estimation to be above zero (McGillivray 2003a:4) which can cause a downward bias in the coefficient estimates (Wooldridge 2003:93).[30]

An alternative method to excluding non aid recipients is to include every developing country in the sample. In this case, however, a number of other issues are raised. For small aid donors such as Australia this means that zero-value aid flows will account for a large proportion of the observations, with bilateral aid observations taking on only strictly positive values (Berthelemy 2006:184). The most common method of controlling for this situation has been through the Tobit Type I estimation technique (McGillivray 2003a; Alesina and Dollar 2005; Canavire et al. 2005). This approach was developed by Tobin (1958) and supposes that there is a latent, that is, unobservable, variable which linearly depends on the vector of explanatory variables. The observable variable is defined to be equal to the latent variable whenever the latent variable is above zero and zero otherwise.

[30] As quoted by McGillivray (2003:4): '[r]esults will almost always be biased if there is non random self selectivity in the data. This applies to not only OLS, but all estimation techniques which do not recognise the limited (non negative, non zero) nature of aid allocations.'

This can be written as:

$$A_{j,t}^{*} = \beta_{\nabla} \nabla_{j,t} + \mu_{j,t} \tag{2.15}$$

$$A_{j,t} = A_{j,t}^{*} \quad iff \quad A_{j,t}^{*} > 0 \tag{2.16}$$

$$A_{j,t} = 0 \quad iff \quad A_{j,t}^{*} \leq 0 \qquad \forall t = 1,\ldots,N \tag{2.17}$$

where $A_{j,t}^{*}$ is the latent aid allocation variable at time t, $A_{j,t}$ is the actual observable aid variable, $\nabla_{j,t}$ is the vector of explanatory variables and the error terms are assumed to be independent and normally distributed such that $\mu_{jt} \sim N(0,\sigma)$. This approach assumes there is an underlying stochastic index equal to $\beta_{\nabla} \nabla_{j,t} + \mu_{j,t}$ which is observed only when it is positive, therefore qualifying it as an unobserved latent variable (McDonald and Moffitt 1980:318).

One disadvantage of the Tobit Type I method cited by authors such as Berthelemy and Tichet (2004:259) is that it produces only a single set of estimates summarising the overall impact of the explanatory variables on aid recipients. This problem emerges because Tobit Type I coefficients summarise the effects of three different conditional means within the model—those of the latent aid variable $(A_{j,t}^{*})$, the observed dependent variable $(A_{j,t})$ and the uncensored observed dependent variable $(A_{j,t} \mid A_{j,t} > 0)$ (Roneck 1992:503).

As a result, the marginal effects of each explanatory variable in Tobit Type I models are not clear from the ordinary coefficient estimates (Sigelman and Zeng 1999:170). As McDonald and Moffit (1980) outline, this has caused many studies using the Tobit Type I model to misinterpret their results. One way in which researchers have dealt with this issue in the aid allocation literature is to focus on the sign and significance of the aggregated (latent) Tobit coefficients, as was done in McGillivray (2003a) and in Alesina and Dollar (2005).[31]

McDonald and Moffitt (1980) show, however, that the marginal effect of the explanatory variables on the observed dependent variable can be further decomposed into each of its two parts. This chapter adopts this decomposition method to calculate firstly the effect of each independent variable on aid allocations when it is in a non limit, that is, non zero,

[31] Long (1997:207) argues that if the principal concern is on the latent dependent variable, then the Type I coefficient estimates can be interpreted similarly to those obtained from ordinary OLS results. However, if the outcome variable actually summarises two separate processes over the latent variable and these separate processes are of interest, this approach is no longer valid.

case; secondly, to calculate the change in the probability of aid allocations being above zero, again weighted by the expected value of aid allocations if they are above zero (McDonald and Moffitt 1980:319).[32] In effect, this gives the impact of each of the explanatory variables on the probability of having a non zero observation (Roneck 1992:503).[33]

2.5 Data Collection and Measurement

2.5.1 Measuring Donor Interest

Australian self interest is captured through a variety of measures. Commercial considerations are measured by including country *j*'s receipt of Australian exports as a percentage of Australian gross domestic product (GDP). This measure reflects the importance of each aid recipient as a destination of Australian exports. Data for this variable was obtained from the International Monetary Fund (IMF) Direction of Trade (2007) and International Financial Statistics' (2007) database.

The distance between Australia and the recipient is included to capture the influence of a recipient's regional proximity to Australia on the amount of aid it receives. This variable reflects Australia's motivation in assisting those countries which are closest to itself after controlling for other typical determinants of aid dispersion. The geographical proximity variable helps to overcome a number of limitations of traditional measures of Australia's strategic priorities, such as arms transfers or military expenditure. One of the limitations is that a majority of the SIDS of the South Pacific have zero (or unrecorded) values for these types of variables.

A second limitation is that the security concerns of the Australian aid program are less likely to be related to the military might of recipients per se than to a potential security breakdown, creating adverse consequences through humanitarian and economic migration or organised crime syndicates (Alpers 2005:58; AusAID 2006). In fact, it is conceivable that

---

[32] The Tobit estimation method is also useful because the logarithmic transformation of zero-value aid flows is undefined (that is, negative infinity), which in turn requires either truncating the data set or censoring the zero-value trade flows. As already discussed, whilst it has been an approach adopted by others, truncating the data set is not an option as it discards a large amount of legitimate information from the model. Foster (1986:111) and Gujarati (1995:387) suggest that for such cases the variables of interest may simply be re-centred, which is done by adding to each observation the absolute value of the minimum taken by the variable plus one. This approach is also adopted in a number of studies from the trade literature, most recently in Todo and Kimura (2007:10). One dollar is added to all zero responses, which results in $\ln(a_{ijt}) = \tau_y = 0$, where, $\tau = \tau_y = 0$.

[33] It must be highlighted, however, that the coefficient estimates from this decomposition must be evaluated at some value of $X\beta$, which is typically taken at the mean value of the explanatory variables (that is, evaluated at $\overline{X}\beta$). It is incorrect to generalise the interpretation of the coefficient estimates to the sample as a whole (Kang 2005).

in some instances a greater control of force by governments in the region may actually strengthen the security situation, leading donors to allocate less foreign aid to the respective country. For example, if the Solomon Islands Government had a more extensively equipped military and/or police force, the 2001 Australian-led RAMSI intervention may not have been required following the escalation of ethnic tensions.

The distance data used in this chapter measures the great-circle distance[34] between capital cities and is sourced from Byers (2007). As a check for robustness, alternate estimations are also made using total military expenditure of the recipient as a percentage of its GDP as well as total arms imports and exports. Data limitations restrict the sample size of observations and reduce the time period to 1988–2004. This data is sourced from the World Bank (2008a) and measured in constant 2005 US$. Estimations will also be made with regional dummies for the Pacific Islands, Southeast Asia and Africa to determine whether the distance effect can simply be captured by these typical regional effects or whether the proximity is better captured by a continuous measure, such as distance, which allows for variations in impact within regions.

The final measure of donor interest is the net amount of non Australian aid flows allocated to each recipient country, including both multilateral and bilateral aid. On the one hand, these other aid flows can be seen as a substitute for Australian aid so that recipients which receive large quantities of aid from other donors require, *ceteris paribus*, less assistance from Australia and vice-versa. On the other hand, a large number of authors have also found that many donors allocate more aid to countries already receiving high aid flows. Dudley and Montmarquette (1976:137) were the first to report this effect, terming it the 'bandwagon strategy' as it allows the donor to top-up already existing aid flows to increase the perceived impact of its own aid. As a result, the expected sign of the other aid coefficient will be ambiguous, depending on which effect dominates. This data is sourced from the OECD DAC database and measured in constant 2005 US$.

2.5.2 Measuring Recipient Need

GDP per capita and GDP per capita growth are used to capture recipient need, both in a static sense (measured by income levels) and in a dynamic sense (measured by changes in income). The inclusion of these variables is in keeping with practices in the broader literature, and whilst by no means perfect indicators of recipient need, they do capture the

[34] The great-circle distance is the shortest distance between any two points on the surface of a sphere measured along a path on the surface of the sphere (as opposed to going through the sphere's interior).

prevailing economic situation in the recipient country and reflect Australian perceptions of need. This data is converted from constant 1985 international dollars to constant 2005 US$ with data taken from the Penn World Tables (PWT) (2007). Income-based measures of recipient need are also augmented with a welfare variable measuring infant mortality rates.[35] This data is taken from the World Development Indicators (WDI) database.[36]

A measure of institutional quality is also incorporated as part of the recipient need specifications for two reasons. Firstly, Australia has expressed a growing desire to allocate additional funds to those governments which are perceived as satisfying good governance criteria. This measure is incorporated as part of the recipient need specification given that an increasing amount of literature has shown aid tends to be more effective when delivered to those countries where the quality of economic policies and governance capacity are highest (Burnside and Dollar 2000; Collier and Dollar 2002; Burnside and Dollar 2004). Allocating more aid to countries which improve the quality of their governance is therefore, *ceteris paribus*, likely to enhance the poverty-reducing impact of Australian aid.[37] Secondly, the inclusion of this variable will also allow the estimation to ascertain whether Australia has been increasingly motivated by policy-based selectivity in the current decade or whether the variety of other motivations have limited its ability to carry through with this aspiration. To measure this effect, a rule of law variable is included to proxy for the overall governance environment of recipient countries. This variable is taken from World Bank (2008a) and is an index ranging from -2.5 (poor) to 2.5 (good).

2.5.3 Measuring Colonial History

To control for colonial history three measures are employed. For Australia, historical relationships are strongly influenced by its British colonial legacy. As such, a dummy variable measuring whether country *j* is an ex-British colony or protectorate is included. The list covers 74 countries (see Appendix 2.1). The second is a variable measuring what fraction of the recipient population speaks English to measure the depth of these historical colonial relationships. The third is a cumulative measure of the fraction of the population

[35] This variable offers a number of advantages over other aggregate welfare measures such as life expectancy. Firstly, it is much more responsive to changes in the prevailing economic, social and political conditions of a country as opposed to life expectancy which changes only very slowly over long periods. Secondly, it is a discrete variable which measures outcomes and is easily observable. Lastly, and potentially because of these first two reasons, it is perhaps the most commonly collected data in most developing countries, giving a rich data source with a reduced potential for bias as opposed to other prospective measures such as literacy rates.

[36] For a number of countries this data is subject to missing values for multiple years. In these cases, the missing observations have been linearly extrapolated for missing, and in the event that the last observation was before the final year of the sample, the mortality rate was assumed to remain constant.

[37] Whilst these studies have been subsequently disputed in the wider aid effectiveness literature (see, for example, Easterly 2003), there is little doubt of the impact that their findings have had on the mind-set of aid donors (Wood 2008:1125).

which speaks a European language (including English), included to capture the historical linkages which Australia's aid recipients may have to other European donors. Both of these linguistic variables are taken from Hall and Jones (1999) and extended to a number of South Pacific countries as described in Appendix 2.2.

2.5.4 Other Measurement Issues

For the dependent variable, total net bilateral ODA flows between Australia and recipient *j* are taken from the OECD Development Assistance Committee (DAC) aid disbursements database and measured in constant 2005 US$.[38] The technical assistance component of total ODA is defined as per OECD (1991), which states that it includes 'assistance activities designed to improve the level of knowledge, skills, technical know-how, or productive aptitudes of a population in a developing country'. Recipient country population is taken from the Penn World Tables v6.2 and measured in thousands of people (Heston et al. 2006).

In keeping with the literature, all explanatory variables are lagged by one period to avoid simultaneity bias. This approach is also appropriate because decisions over aid allocation are generally made at the beginning of each budgetary cycle—hence they are not influenced by current period outcomes. Given the importance of Pacific Island countries to Australia's aid program, missing information for a number of these variables was collected from a variety of regional sources such as the Pacific Regional Information System (PRISM). A full list of these additions and an explanation of it can be found in Appendix 2.2. The summary statistics for each of these core variables are displayed below in Table 2.1.

For the core model, the data set includes data for 160 aid recipient countries, 136 of which Australia has given aid to between 1980 and 2005.[39] This sample includes 2,964 observations, of which 1,515 are non zero in Australian aid. The maximum aid amount is US$538 million which was given to PNG in 1980, whereas the smallest amount was given to Botswana in 1999 at US$10,000. The closest aid recipient capital city to Canberra is Noumea in New Caledonia, whilst the furthest is Rabat in Morocco. The most populous aid recipient is China, with a population of 1.29 billion in 2005, and the smallest is Niue with a population of 1,200 in 2004.

[38] Feeny and McGillivray (2004:107) provide a discussion of the relative merits of using commitment versus actual disbursement data. In the present case, the quality of Australian commitment data was not of sufficient quality for the sample of countries under consideration, limiting the choice to the use of disbursements.

[39] Palestine is not included in any of the estimations, which received an average US$2.8 million of Australian ODA since 1992.

Table 2.1: Summary Statistics of Non Censored Sample

Variable	Description	Obs	Mean	Std. D	Min	Max
ODA	Natural logarithm of ODA receipts measured in constant 2006 US$	2,964	7.16	7.25	0.00	20.09
TA/ODA	Proportion of ODA given in the form of technical assistance.	2,964	0.55	0.39	0.00	1.00
Rgdpch	Natural logarithm of real GDP per capita	2,964	8.09	1.02	5.14	10.81
Rgdpchg	Real GDP per capita growth	2,964	0.01	0.14	-0.63	6.23
Infmort	Natural logarithm of infant mortality	2,964	3.74	0.88	0.69	5.25
Rule	Rule of law Index	2,964	-0.24	0.74	-2.17	1.85
Othoda	Natural logarithm of other ODA receipts	2,964	16.67	5.80	0.00	22.66
Exportsgdp	Australian exports to recipient j as a proportion of Australian GDP	2,964	0.00	0.00	0.00	0.01
Dist	Natural logarithm of distance between donor and recipient	2,964	9.36	0.41	7.91	9.79
Armstrade	Total arms trade in recipient j	2,964	95.80	378.00	0.00	5,660.00
Militaryex	Military expenditure as a per cent of GDP	2,667	4.48	43.10	0.00	1,457.00
Pop	Natural logarithm of population	2,964	8.79	1.84	4.07	14.07
Engfrac	Fraction of the population speaking English	2,964	0.07	0.23	0.00	1.00
Eurfrac	Fraction of the population speaking European	2,964	0.17	0.34	0.00	1.00
Brcol	British colony dummy	2,964	0.39	0.49	0.00	1.00
Pic	Pacific Island dummy	2,964	0.07	0.25	0.00	1.00
Asiae	East Asia dummy	2,964	0.08	0.27	0.00	1.00
Africa	Africa dummy	2,964	0.36	0.48	0.00	1.00

2.6 Estimation Results

2.6.1 Aggregate Model (1980–2005)

To begin, Table 2.2 presents the OLS and latent Tobit coefficient results for the full 25 year sample in columns 1 and 2, respectively.[40] The decomposed coefficients are then presented in column 3, which shows marginal effects conditional on the dependent variable being uncensored, and column 4 presents the impact of each of the explanatory variables on the probability of being uncensored.

[40] All estimations were carried out using STATA Version 9.1. Due to coding requirements, the program was converted to Version 8 for the marginal effect calculations.

Table 2.2: Core Model Estimation Results with Marginal Effects (1980–2005)

	ODA: 1980–2004	(1)	(2)	(3)	(4)
		OLS	Tobit	Marginal Effects	
			Latent	Cond. Uncensored	Prob. Uncensored
R	Rgdpch[1]	-1.492	-1.814	-0.823	-0.088
		(0.176)**	(0.288)**	(0.131)**	(0.014)**
R	Rgdpchg[2]	-0.024	-0.770	-0.349	-0.037
		(0.708)	(1.339)	(0.608)	(0.065)
R	Infmort[3]	-0.296	0.421	0.191	0.020
		(0.183)	(0.350)	(0.159)	(0.017)
R	Rule[4]	1.138	1.816	0.824	0.088
		(0.201)**	(0.306)**	(0.139)**	(0.015)**
I	Othoda[5]	0.284	0.882	0.400	0.043
		(0.017)**	(0.054)**	(0.024)**	(0.003)**
I	Exportsgdp[6]	-142.346	-26.940	-12.225	-1.307
		(147.147)	(235.557)	(106.887)	(11.427)
I	Distj[7]	-8.974	-14.142	-6.417	-0.686
		(0.321)**	(0.463)**	(0.210)**	(0.022)**
C	Engfrac[8,*]	-0.332	-0.268	-0.122	-0.013
		(0.383)	(0.775)	(0.352)	(0.038)
C	Eurfrac[9,*]	-0.040	1.843	0.836	0.089
		(0.410)	(0.589)**	(0.267)**	(0.029)**
C	Brcol[10,*]	4.311	7.421	3.605	0.334
		(0.223)**	(0.392)**	(0.178)**	(0.019)**
	Pop	1.142	1.690	0.767	0.082
		(0.058)**	(0.107)**	(0.049)**	(0.005)**
	Constant	89.715	118.346	53.701	5.741
		(3.878)**	(5.553)**	(2.520) **	(0.269) **
	Obs.	2,964	2,964	2,964	2,964
	Uncens/Cens	-	1,515/1,449	-	-
	OLS R^2	0.580	0.580	-	-
	Pseudo R^2	-	0.157	-	-
	$\Psi_{1,4}$**	F(4) = 19.96 Prob> F = 0.000	F(4) = 19.96 Prob>F = 0.000		
	$\Psi_{5,7}$	F(3) = 764.08 Prob> F = 0.000	F(3) = 764.08 Prob> F =0.000		
	$\Psi_{8,10}$	F(3) = 128.69 Prob> F = 0.000	F(3) = 128.69 Prob>F =0.000		

Robust standard errors in parentheses; * Significant at 5% level; ** Significant at 1% level; Time dummies excluded from table. (*) dF/dx is for a discrete change of dummy variable from 0 to 1. (**) F-Test for joint significance of R, I and C categories (that is, that each coefficient equals zero). In each estimation the Likelihood Ratio Chi-Squared (χ^2) test indicates that each of the equations are individually significant with at least one of the predictors' regression coefficients not being equal to zero at a 99 per cent confidence interval.

The OLS coefficients indicate firstly that of the four recipient need variables, only real GDP per capita and the rule of law coefficients have had a significant impact on aid allocations, with more aid going to countries with lower per capita incomes and better policy performance. Other intuitively signed and significant explanatory variables include the distance term, other ODA, the British colony dummy and recipient population size; GDP growth, child mortality, exports and the two linguistic measures of colonial connection are all insignificant.

Consistent with the theory outlined in McGillivray (2003a), the OLS results put a downward bias on each of the significant OLS coefficient estimates once they have been adjusted with the Tobit estimation method. Nevertheless, in terms of sign and significance nearly all the OLS results are repeated in the latent Tobit coefficients. Firstly, real GDP per capita again has a highly statistically significant negative coefficient, whilst the rule coefficient is significant and positive, supporting the notion that Australia has had a preference for aiding the poorest populations and for giving assistance to those countries which have better performing institutions.

In terms of donor interest, the highly significant and positive coefficient on the distance variable indicates that Australia has allocated significantly more aid to countries in the region even after controlling for shared colonial history, trade linkages and levels of regional poverty. The other donor ODA variable is also highly significant and positive, indicating that Australia has tended to allocate more aid to countries which already receive high levels of aid from other donors. One interpretation of this result is that Australia has been susceptible to bandwagon effects in its aid allocation during this 1980–2005 period.

Trade motivations appear not to have had a significant impact on the allocation decisions of Australia's aid program over the last 25 years, with the exports to GDP coefficient remaining both negatively signed and insignificant. The colonial heritage variables differ from the OLS estimations with both the British colony and European language variables recording significant and positively signed coefficients. The British colony variable illustrates the clear bias that Australia displays towards giving foreign aid to its historical colonial partners—beyond the fact that many happen to be located in close geographic proximity. The eurfrac coefficient indicates, however, that this bias extends not only to Australia's British heritage but also to countries which share a European colonial heritage.[41]

The final three rows of Table 2.2 also provide a number of joint significance F-Tests for each of the recipient need ($\Psi_{1,4}$), donor interest ($\Psi_{5,7}$) and colonial heritage ($\Psi_{8,10}$) categories. Consistent with much of the previous literature on the motivations of Australian aid allocation, these results suggest that Australia has been driven by all three of these motivations in determining its aid allocation over the last 25 years.

[41] This could be represented, for example, by countries such as Vietnam, Cambodia and Burma which have a strong francophone connection yet receive significant quantities of Australian aid.

To measure the fit of the model to the data, two measures are used. The first is a pseudo-R^2 calculated according to the method described by Sribney (1997). The second is a simple adjusted-R^2 from the OLS estimation of the model. The reason this second variable is included is because of the limitations of the pseudo-R^2 measure which can place a significant downward bias on the supposed explanatory power of the Tobit model (this issue is discussed in Appendix 2.3). The pseudo-R^2 reports a figure of 0.16 whilst the OLS method indicates a relatively high explanatory power of the model with an adjusted-R^2 of 0.58.

The results presented in column 3 and 4 demonstrate the disaggregation of the latent coefficients into their two separate effects. These estimates also allow an analysis of the relative size of the core coefficient estimates. Here it is observed, for example, that a one percentage point increase in real GDP per capita leads, *ceteris paribus*, to an approximately 0.8 per cent decline in aid receipts and a 0.09 per cent decrease in the probability of receiving any aid at all. Similarly, a one per cent increase in aid received from other donors leads on average to a 0.4 per cent increase in aid from Australia and a 0.043 per cent increase in their probability of receiving aid. Both of these effects are highly statistically significant.

A one percentage point increase in population is shown to lead to an approximately 0.77 per cent increase in foreign aid receipts. Given this coefficient is less than one, it also indicates that in per capita terms Australia has tended to give more foreign aid to countries with smaller populations. This effect may be partly explained by the many fixed costs associated with aid delivery and the economies of scale achievable in larger aid programs. Smaller aid programs, for example, require a relatively higher number of administrative staff per dollar spent as opposed to those delivered in larger countries with larger projects. In addition, a 1 per cent increase in population size increases the likelihood, *ceteris paribus*, that a country will receive foreign aid from Australia by approximately 0.08 per cent. This small coefficient size may reflect the tendency for donors to allocate foreign aid to places where it is believed to have the greatest impact. In other words, a given quantity of money will be more visible in a small rather than a large country.

The final variable of interest is the distance effect. Here it is observed that, *ceteris paribus*, a 1 per cent increase in distance from Australia leads both to a 6.4 per cent decline in aid receipts for those already receiving assistance and a 0.7 per cent decline in the likelihood of receiving Australian aid. Given that all of the other typical determinants of aid allocation

have been controlled for, it may be reasonable to assess this effect as being representative of the greater importance that countries closer to Australia have in achieving the security and strategic objectives of its aid program.

2.6.2 Disaggregated Model (1980–2005)

In the previous table, the aid allocation decisions made by Australia over the last 25 years were aggregated into a single estimation. This pooling of aid receipts may be aggregating important changes in the composition and motivations of Australia's aid allocations. Hence, this section estimates the model for four different periods. The first from 1980 to 1984 represents the pre Jackson Review period, the second from 1985 to 1990 the immediate post Jackson Review, the third from 1991 to 1996 the pre Simons Review period and the fourth from 1997 to 2004 the post Simons Review period. Table 2.3 below presents the results.

The first major trend seen across the time periods is the decline in size of the real GDP per capita coefficient across the first three periods, which becomes insignificant in the post Simons Review period. When combined with the continued insignificance of both the real GDP per capita growth and infant mortality variables, this finding indicates a declining impetus of recipient need in the motivations of Australian aid, particularly in the post Simons Review era. Another explanation for this finding is the increasing significance of the distance coefficient in the post Simons Review period—suggesting that Australia has, ceteris paribus, been placing a growing focus on allocating aid towards countries within its immediate region. This situation may thus reflect how growing regional priorities of aid can impact negatively on the ability of aid resources to be directed towards those countries with the lowest per capita incomes.

The deterioration of the welfare focus of aid in the post Simons Review period is also reflected by the increase in policy-based selectivity during the 1990s. Following a statistically significant coefficient estimate in the pre Jackson Review period, the rule of law variable becomes insignificant in the post Jackson Review period but then returns as a highly significant explanatory variable in the pre and post Simons Review periods. This trend is supported at the global level by authors such as Berthelemy and Tichit (2004:271) who find that the most effective mechanism for developing countries to increase their donor assistance during the 1990s was to improve the quality of their domestic institutions. Moreover, these authors find that this effect is particularly large in regard to Australian

assistance, with an institutional bonus seven and a half times higher than that for the average donor.[42]

Table 2.3: Australian Aid Allocations by Major Period (1980–2005)

	ODA: 1980-2005	(5)	(6)	(7)	(8)
	Estimation Type	Tobit-Latent	Tobit-Latent	Tobit-Latent	Tobit-Latent
	Period	1980–1984 Pre Jackson	1985–1990 Post Jackson	1991–1996 Pre Simons	1997–2005 Post Simons
R	Rgdpch[1]	-3.463	-2.403	-2.093	-0.360
		(0.736)**	(0.527)**	(0.548)**	(0.528)
R	Rgdpchg[2]	3.119	1.549	3.363	-3.369
		(5.852)	(4.937)	(3.309)	(3.014)
R	Infmort[3]	0.463	-0.357	0.624	1.136
		(1.008)	(0.692)	(0.705)	(0.581)
R	Rule[4]	3.358	0.962	1.555	1.902
		(0.786)**	(0.519)	(0.586)**	(0.589)**
I	Othoda[5]	0.830	0.693	0.823	1.043
		(0.132)**	(0.096)**	(0.111)**	(0.099)**
I	Exportsgdp[6]	205.986	1,081.356	372.987	-954.139
		(704.818)	(609.399)	(391.334)	(412.854)*
I	Distj[7]	-12.367	-12.240	-12.589	-17.421
		(1.253)**	(0.842)**	(0.861)**	(0.874)**
C	Engfrac[8,*]	2.496	-2.590	-0.893	-0.185
		(2.182)	(1.451)	(1.386)	(1.446)
C	Eurfrac[9,*]	2.338	5.652	2.617	-2.128
		(1.634)	(1.060)**	(1.084)*	(1.106)
C	Brcol[10,*]	8.433	9.185	7.811	5.254
		(1.023)**	(0.699)**	(0.733)**	(0.722)**
	Pop	1.809	1.389	1.422	2.029
		(0.307)**	(0.199)**	(0.191)**	(0.203)**
	Constant	112.772	115.980	117.504	146.639
		(13.591)**	(9.261)**	(9.616)**	(9.247)**
	Obs.	345	683	794	1142
	Uncens/Cens	185/160	402/281	429/365	643/499
	OLS R^2	0.654	0.604	0.572	0.579
	Pseudo R^2	0.175	0.149	0.152	0.171
	$\Psi_{1,4}$**	F(4)= 9.76 Prob >F = 0.00	F(4) = 7.34 Prob >F =0.00	F(4) = 8.02 Prob>F =0.00	F(4) = 3.68 Prob > F = 0.00
	$\Psi_{5,7}$	F(3) = 41.13 Prob>F =0.00	F(3) = 84.37 Prob>F =0.00	F(3) = 82.18 Prob>F =0.00	F(3) = 138.15 Prob>F =0.00
	$\Psi_{8,10}$	F(3) = 26.13 Prob>F =0.00	F(3) = 59.48 Prob>F =0.00	F(3) = 39.73 Prob>F =0.00	F(3) = 22.37 Prob > F = 0.00

Standard errors in parentheses; * Significant at 5% level; ** Significant at 1% level; Time dummies excluded from table. (*) dF/dx is for a discrete change of dummy variable from 0 to 1. (**) F-Test for joint significance of R, I and C categories (that is, that each coefficient equals zero). In each estimation the Likelihood Ratio Chi-Squared (χ^2) test indicates that each of the equations are individually significant with at least one of the predictors' regression coefficients not being equal to zero at a 99 per cent confidence interval.

The remaining elements of donor interest also change considerably across these periods. The exports to GDP variable remains insignificant in the first three periods but becomes significant at a 95 per cent confidence level in the final period with a negative coefficient

[42] This result coincides with those of Alesina and Dollar (2000) who conclude that political rights have had a positive impact on the amount of aid allocated by Australia, Canada, Germany, Japan, the Netherlands, Scandinavian countries, the UK and the US. Likewise Alesina and Weder (2002) find that only Australia and the Scandinavian countries give more aid to countries with low levels of corruption whilst the US, the UK, Canada, Italy, Germany, Spain and Switzerland are not influenced by the recipient's policy environment.

sign. This result is counter intuitive, suggesting that Australia actually gave less aid to countries with which it had increased trade relations during 1997–2005 but nevertheless supports the hypothesis that Australia's aid allocation decisions are not biased by commercial considerations.

The Other ODA coefficient remains, in contrast, highly significant and positively signed throughout the estimations, suggesting that bandwagoning has continued to take place in Australia's aid allocation decisions. Another explanation for this behaviour is what Round and Odedokun (2004) term as 'peer pressure'. In this case, Australia's aid effort could be seen as a positive function of other donors' allocations due to multilateral commitments whereby donors seek to match each others' effort; for example, to meet jointly agreed DAC aid allocation targets to specific countries (Round and Odedokun 2004:298).

In terms of colonial heritage, the European language variable coefficient is significant in only the post Jackson and pre Simons Review periods; the English language variable is insignificant throughout. The British colony and protectorate variable has, however, remained highly significant within each estimation period although it has consistently decreased in size since the Jackson Review.

Finally, the joint significance F-Tests reveal that both donor interest and colonial history have continued to play a highly significant role in motivating Australian aid allocation across all four time periods. An interesting aside to this result is that once the rule of law variable is excluded from the joint recipient need F-Test, the remaining variables (GDP per capita, GDP per capita growth and infant mortality) have no significant joint explanatory power over aid allocations in the post Simons Review period at a 90 per cent confidence interval. This situation highlights an important trade-off which Australia faces in choosing whether to implement governance-based methods of aid allocation within the region. That is, allocating more aid to countries satisfying good governance criteria is likely to correspond with a declining responsiveness to providing aid to those countries which in fact need that assistance the most. This issue shall be discussed in more detail shortly.

2.6.3 Robustness Checks

Amongst other findings, the previous results highlighted the importance of distance in the determination of Australian aid allocations, which was said to more accurately reflect the strategic regional priorities of the aid program than traditional measures of arms trade and military expenditure. Table 2.4 tests whether this assumption affects the results with the inclusion of alternative explanatory variables.

Table 2.4: Australian ODA Allocation—Alternative Explanatory Variables

	ODA: 1980–2004	(9)	(10)	(11)	(12)
		Tobit-Latent	Tobit-Latent	Tobit-Latent	Tobit-Latent
R	Rgdpch[1]	-1.707	-1.894	-1.830	-1.914
		(0.321)**	(0.326)**	(0.318)**	(0.297)**
R	Rgdpchg[2]	-0.514	-0.452	-0.068	-0.626
		(1.381)	(1.362)	(1.546)	(1.313)
R	Infmort[3]	0.088	0.507	1.579	0.732
		(0.399)	(0.440)	(0.409)**	(0.386)
R	Rule[4]	1.555	1.703	2.198	1.787
		(0.339)**	(0.344)**	(0.336)**	(0.313)**
I	Othoda[5]	0.934	0.838	0.829	0.828
		(0.063)**	(0.062)**	(0.055)**	(0.053)**
I	Exportsgdp[6]	-156.137	-330.529	44.193	-249.420
		(263.466)	(276.849)	(258.213)	(244.000)
I	Distj[7]	-14.497	-16.978	-	-15.665
		(0.539)**	(1.083)**		(0.919)**
I	Armstrade[8]	0.0001	0.0003	-	-
		(0.0019)	(0.001)		
I	Militaryex[9]	0.005	0.005	-	-
		(0.004)	(0.004)		
C	Engfrac[10,*]	-0.461	0.794	-3.821	1.189
		(1.103)	(1.177)	(0.887)**	(0.873)
C	Eurfrac[11,*]	1.319	1.377	2.057	1.898
		(0.680)	(0.694)*	(0.644)**	(0.603)**
C	Brcol[12,*]	7.729	7.650	10.422	7.531
		(0.419)**	(0.457)**	(0.427)**	(0.421)**
	Pop	1.639	1.496	1.719	1.577
		(0.133)**	(0.136)**	(0.118)**	(0.110)**
	Africa[13,*]	-	-0.637	-2.465	-0.438
			(0.543)	(0.530)**	(0.506)
	Easia[14,*]	-	-0.288	11.106	0.831
			(1.037)	(0.713)**	(0.876)
	PIC[15,*]	-	-7.823	15.524	-4.569
			(1.807)**	(0.876)**	(1.392)**
	Constant	124.226	153.062	-18.666	135.758
		(7.339)**	(12.332)	(5.316)**	(10.188)**
	Obs.	2,667	2,667	2,964	2,964
	Uncens/Cens	1,336/1,331	1,336/1,331	1,515/1,449	1,515/1,449
	OLS R^2	0.574	0.583	0.534	0.585
	Pseudo R^2	0.155	0.157	0.139	0.159
	$\Psi_{1,4}$**	F(4) = 12.50 Prob > F = 0.000	F(4) = 18.99 Prob > F = 0.000	F(4) = 22.82 Prob > F = 0.000	F(4) = 19.02 Prob > F = 0.000
	$\Psi_{5,9}$ / $\Psi_{5,6}$/$\Psi_{5,7}$	F(5) = 164.47 Prob > F = 0.000	F(5) = 155.29 Prob > F = 0.000	F(2) = 115.48 Prob > F = 0.000	F(3) = 163.66 Prob > F = 0.000
	$\Psi_{10,12}$	F(3) = 123.11 Prob > F = 0.000	F(3) = 121.22 Prob > F = 0.000	F(3) = 203.15 Prob > F =0.000	F(3) = 125.35 Prob > F = 0.000

Robust standard errors in parentheses; * Significant at 5% level; ** Significant at 1% level; Time dummies excluded from table. (*) dF/dx is for a discrete change of dummy variable from 0 to 1. (**) F-Test for joint significance of R, I and C categories (that is, that each coefficient equals zero). In each estimation the Likelihood Ratio Chi-Squared (χ^2) test indicates that each of the equations are individually significant with at least one of the predictors' regression coefficients not being equal to zero at a 99 per cent confidence interval.

Column 9 presents the results of the core model with the inclusion of both arms trade and military expenditure variables. Neither of these variables record statistically significant coefficient estimates, whereas the distance term remains highly significant. In addition, each of the other explanatory variables remains relatively unchanged from its original estimation.

Column 10 presents the estimation results of the full model with the inclusion of the military expenditure and trade variables as well as regional dummies for the Pacific and Southeast Asia. A dummy variable for Africa is also included in the estimations because of the region's special circumstance as the world's major aid recipient and poorest continent. The inclusion of these regional dummies also tests whether the distance variable simply represents the special relationship which Australia has developed with many of its Pacific Island and Southeast Asian neighbours or whether there is any specific continuous distance effect. In this case, neither the African nor the Southeast Asian dummies are significant whereas the Pacific Island dummy has a highly significant but negative coefficient. This result is also supported in column 12 which shows the same estimation but excluding the military expenditure variables.

The removal of the distance term in column 11 leads to the Pacific Island dummy recording a highly significant and positive coefficient estimate. The combination of this and the previous negative coefficient for the Pacific Island dummy highlights the importance of regional proximity in the determination of Australia's aid flows to its immediate region—rather than any other unique characteristics of the Pacific Islands. Indeed, once the important role of distance has been controlled for these results suggest that Australia gives less aid to these countries than what otherwise might be expected based on the priorities established by its other aid disbursements. Further, with the exclusion of the distance variable both the adjusted-R^2 and pseudo-R^2 values drop considerably from the core estimation shown in column 2 of Table 2.1, suggesting that the use of the continuous distance term rather than the regional dummy is more suited to the data.

Notably, in all of these estimations the rule of law, other ODA, population and British colony variable coefficients have remained highly significant and positively signed, whilst the real GDP per capita variable has remained significant and negative. These alternative specifications thus also support the robustness of the previous core estimations.

2.6.4 What has Determined Australia's Growing Focus on Technical Assistance (1996–2005)?

As discussed, Australia now allocates more than twice as much of its aid program in the form of technical assistance than the average of all other OECD bilateral donors. Chart 2.2 illustrates how this situation is a result of a sustained expansion in the volume of aid given as technical assistance since the beginning of the 1990s. This section uses the above framework incorporating the proportion of total Australian ODA provided as technical

assistance as the dependent variable in order to determine how factors affecting patterns of Australian aid allocations have influenced this shift in aid policy over the last decade.

Given the significance of institutional motivations in giving technical assistance, a number of additional governance indicators are also included in these estimations—beyond the rule of law indicator used in the previous specifications which acted as a proxy for the overall governance environment. The first of these indicators is a measure of government effectiveness which assesses the 'quality of public services, the quality of the civil service and the degree of its independence from political pressures, and the quality of policy formulation and implementation' (Kauffmann et al. 2007:3). The second is regulatory quality which measures the 'ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development' (Kauffmann et al. 2007:4). The third is control of corruption which measures 'the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests' (Kauffmann et al. 2007:4). Each variable is measured within an index ranging from -2.5 (poor) to 2.5 (good) and is sourced from Kauffmann et al. (2007).

The following estimations also include the dependent variable from the previous estimations, total Australian ODA, as an explanatory variable to control for whether the size of Australia's aid effort influences the types of aid modalities it adopts. All of the other variables remain unchanged. The sample is restricted to 1996–2005 due to the inclusion of the additional governance indicators which are only available from 1996 onwards. It is during this same period that technical assistance has taken a dominant role within the Australian aid program.

Table 2.5 presents the estimation results. Column 13 shows the estimation results using the pooled OLS method from the entire sample between 1996 and 2005. In this case, there are again a large number of zero observations for the occasions when Australia decides to give foreign aid to a recipient but none of it is in the form of technical assistance. Column 14 reports the Tobit estimation results of the full sample. Column 15 reports the Tobit results of the estimation for 1996–2000 and column 16 reports them for 2001–2005. This disaggregation determines whether the heightened security environment established in the aftermath of the 2001 terrorist attacks led to a structural shift in Australia's motivations for giving a higher proportion of its aid as technical assistance. A number of interesting results are shown.

Firstly, each of the coefficients on the total Australian ODA variable is highly significant and negatively signed, suggesting that the larger the size of the total Australian aid resources given to a recipient, the lower the proportion of that aid which will be given as technical assistance. The volume of aid given by other donors, however, appears to have no impact on the aid modalities chosen by Australia, with the OthODA variable recording insignificant coefficients across the entire estimation.

Table 2.5: Determinants of Australian Technical Assistance (1996–2005)

Proportion of Australian ODA as Technical Assistance	(13) Pooled OLS (1996–2005)	(14) Tobit (1996–2005)	(15) Tobit (1996–2000)	(16) Tobit (2001–2005)
Ln(AusODA)	-0.041	-0.039	-0.063	-0.009
	(0.011)***	(0.011) ***	(0.013) ***	(0.019)
Ln(Rgdpch)	0.043	0.045	0.040	0.072
	(0.026)	(0.030)	(0.037)	(0.051)
Ln(Infmort)	0.114	0.129	0.139	0.120
	(0.035)***	(0.036) ***	(0.048) ***	(0.054)**
Govt Effectiveness	0.142	0.158	0.087	0.264
	(0.055)***	(0.065)**	(0.074)	(0.121)**
Regulatory Quality	0.060	0.077	0.090	0.083
	(0.037)	(0.042)*	(0.047)*	(0.077)
Rule of Law	0.014	0.017	0.024	0.028
	(0.040)	(0.050)	(0.058)	(0.090)
Control Corruption	-0.095	-0.110	-0.018	-0.290
	(0.054)*	(0.057)*	(0.062)	(0.111)***
Ln(Othoda)	0.010	0.011	0.015	0.012
	(0.006)	(0.008)	(0.011)	(0.011)
ExportsGDP	47.956	45.744	51.462	42.300
	(15.169)***	(23.337)*	(27.531)*	(39.983)
Ln(Dist)	-0.288	-0.328	-0.269	-0.393
	(0.060)***	(0.065) ***	(0.081) ***	(0.103)***
Engfrac	-0.055	-0.068	-0.040	-0.095
	(0.060)	(0.082)	(0.099)	(0.136)
Eurfrac	-0.139	-0.171	-0.250	-0.077
	(0.082)*	(0.077)**	(0.105)**	(0.113)
Brcol	-0.003	-0.005	0.044	-0.084
	(0.032)	(0.038)	(0.045)	(0.061)
Ln(Pop)	-0.033	-0.033	-0.033	-0.047
	(0.010)***	(0.012) ***	(0.015)**	(0.019)**
Constant	3.345	3.537	3.257	3.516
	(0.675)***	(0.726) ***	(0.862) ***	(1.239) ***
Obs.	568	568	312	256
Uncens/Cens	-	491/77	280/32	211/45
Adj. OLS R^2	0.215	0.215	0.242	0.191
Pseudo R^2	-	0.176	0.272	0.187

Robust standard errors in parentheses; * Significant at 5% level; ** Significant at 1% level; Time dummies excluded from table. (*) dF/dx is for a discrete change of dummy variable from 0 to 1. In each estimation the Likelihood Ratio Chi-Squared (χ^2) test indicates that each of the equations are individually significant with at least one of the predictors' regression coefficients not being equal to zero at a 99 per cent confidence interval.

Levels of technical assistance provided have not been influenced by the income levels of recipient countries, with the real GDP per capita variable recording insignificant coefficient estimates. The child mortality variable, however, records significant and positive coefficients, suggesting that higher rates of child mortality have encouraged significantly

larger proportions of aid given as technical assistance. This could represent a preference by Australia to stem declining service delivery by attempting to strengthen institutional resources rather than funding the delivery of those services directly.

In terms of the institutional characteristics of the recipient, the control of corruption variable has a highly significant and negative coefficient estimate for the full sample Tobit and OLS estimations. In contrast, the government effectiveness and regulatory quality variables both record highly significant and positive coefficient estimates in the full sample Tobit estimation. These results suggest that the perceived level of corruption is the key institutional determinant of the composition of aid given by Australia.[43] Higher levels of corruption lead to a higher proportion of aid delivered through technical assistance. On the other hand, once this corruption bias has been controlled for, Australia gives more technical assistance to countries with better institutional environments. This perhaps reflects a desire to foster greater institutional linkages with countries that display positive institutional and policy behaviour—for a given level of corruption.

Another important result is the significant and positive coefficient estimate on the trade variable. This indicates that the proportion of aid given as technical assistance has been positively related to the amount of trade which Australia has with that country. One explanation is that Australia uses its technical assistance as a vanguard for higher levels of Australian trade, or to protect its pre-existing interests; for example, to ensure that favourable trading arrangements are put in place within the recipient bureaucracy. This role of technical assistance is highlighted in ODE (2008c:10) which states that the Australian aid program 'supports private-sector development through technical assistance to governments to cut red tape and reduce business costs, promote competition, support trade and regional integration...and support facilities designed to assist business'.

The estimation results also indicate that Australia has persistently given a higher proportion of its aid in the form of technical assistance to countries which are both closer to itself and which have smaller populations—shown by the negative and highly statistically significant coefficient estimates on both the distance and population variables. This is an intuitive result given Australia's growing concern over the establishment of functioning and effective states within the SIDS of its immediate region—and its preference for using technical assistance to achieve these outcomes.

[43] It is worth noting that the corruption variable measures the 'control of corruption' rather than corruption such that a negative coefficient estimate indicates a higher proportion of aid in the form of technical assistance to corrupt regimes.

Finally, British colonial connections appear to have had a limited impact on determining how Australia delivers its aid to recipients, evidenced by the insignificant coefficient estimates for both the English language and British colony variables. There is, however, evidence that Australia has tended to offer lower proportions of technical assistance to countries which come from a European colonial heritage, perhaps reflecting the lower levels of diplomatic engagement which Australia has with non English colonised countries.

There are also some important differences across the two time periods considered. In particular, the Australian aid volume, regulatory quality, trade vanguard and European language effects all change from being significant in 1996–2000 to showing insignificant coefficient estimates post 2001. In contrast, the government effectiveness and control of corruption coefficients both become highly significant in the most recent period, whereas they recorded insignificant coefficient estimates for the earlier period. This suggests that in the post 11 September 2001 security environment, Australia has paid increasing attention to the institutional determinants of how much technical assistance it decides to give a recipient. In particular, it has allocated a higher proportion of its aid program in the form of technical assistance to countries which are perceived to be more corrupt. It has also favoured higher levels of technical assistance to countries which have higher levels of overall government effectiveness, perhaps representing a degree of responsiveness by AusAID to support pro reform governments by offering additional human capital resources to embed positive institutional behaviour.

2.7 Discussion and Conclusion

This chapter has sought to assess how Australia's changing strategic, altruistic and colonial motivations have influenced the distribution of its aid program between 1980 and 2005. Econometric techniques have been used, which controlled for the censored nature of the dependent variable and the Tobit decomposition method has been utilised to give a detailed exposition of the dual nature of the Australian aid allocation process. This chapter has also considered a long time series of data which has allowed the analysis of two major government reviews on the allocation priorities of Australian aid as well as whether Australia has been increasingly influenced by governance-based selectivity in the current decade.

On aggregate, the results imply that Australia has over the past 25 years considered various aspects of recipient need, donor interest and colonial heritage in determining its aid

allocations. These results are consistent with studies such as Gounder (1994) and Feeny and McGillivray (2004) who found that both recipient need and donor interest have determined the pattern of Australian aid.[44] Whilst these results also coincide partially with the results of McGillivray and Oczkowski (1991) in terms of the recipient need and donor interest motivations, this chapter has found no evidence that Australia has been influenced by commercial motivations such as trading relationships.

These results do, however, mask important changes in the patterns of Australian aid across the period. This has included a declining influence of colonial legacy and a rise of regional priorities amidst the maintenance of a relatively constant small-country bias. One of the other trends to emerge is that in the post Simons Review period, the influence of recipient need—in terms of GDP per capita, GDP per capita growth and infant mortality—has declined whilst the influence of the distance and the rule of law variables has increased. As mentioned, the decline in welfare motivations in lieu of the rising influence of governance-based allocations highlights a fundamental issue of the performance-based selectivity approach. That is, by rewarding good performers, or punishing bad ones, donors are also likely to increasingly bias aid allocations away from countries that are in fact of the greatest humanitarian need.

The declining responsiveness of Australian aid to measures of recipient need has occurred in tandem with a rise in the influence of geographic proximity on patterns of Australian aid. This highlights another trade-off which Australia must face, which is that as it pursues regionally based strategic and security objectives its responsiveness to levels of recipient need may be reduced. This raises considerable questions over the claim that the aid program can pursue Australian national interests without compromising its responsiveness to global poverty.

These factors have also had a large impact on the type of foreign aid delivered by Australia. In particular, Australia has favoured giving significantly higher proportions of its foreign aid in the form of technical assistance to countries which are smaller, geographically closer and which are perceived to have a poor control of corrupt activities within government. These results highlight the heavy focus which Australia has placed on using technical assistance as a means of securing both its strategic national interest and humanitarian

[44] In contrast, these results oppose the finding of Gounder and Sen (1999) who assert that donor interest and commercial motivations were the dominant factors for Australian aid disbursement.

objectives within the SIDS of the South Pacific. It also highlights the heavy focus which the aid program has placed on pursuing an anti corruption agenda in the region.

Finally, whilst Australia was found not to have significantly biased its levels of aid allocation in favour of trade partners, it has tended to give more aid in the form of technical assistance to these countries. This highlights another avenue through which Australia has used its aid program to pursue trade objectives not previously discussed in the literature.

What does this mean for Australian aid policy in the SIDS of the South Pacific? Clearly, Australia has motivations for its aid program beyond achieving the maximum possible reduction in global poverty. Placing a large focus on the allocation of funds to countries within the immediate region is a natural consequence of these priorities. In this sense, the dual motivations of Australian aid are indeed compatible as Australia seeks to reduce poverty in the SIDS of the South Pacific. The regionalisation of aid delivery is also likely to have allowed Australia to build important specialisations in the countries to which it delivers aid as well as to derive a number of administrative conveniences. It is not immediately clear that Australia or recipient countries would derive any immediate benefit from a reallocation of Australian aid away from the region. Nevertheless, as Australia moves to scale up its aid program it should remain cognisant of the trade-offs mentioned above. Reallocating the aid program with a larger focus on recipient need amongst existing recipients may prove to be valuable in helping the South Pacific make faster rates of progress towards achieving the goals set out under the MDGs.

Finally, a limitation of the finding that Australia has allocated both more aid and higher proportions of technical assistance to countries with better governance is that it may also reflect that the allocation of aid has *caused* improvements in policy performance. This raises a final point worth noting. Patterns of aid allocation are only one component of the broader challenge of improving the effectiveness of Australian aid at alleviating poverty and helping countries to achieve the MDGs. In this sense, the key ability of aid to improve development outcomes depends on its ability to improve the performance of these recipient country bureaucracies and on how it interacts with these bureaucracies to influence domestic economic outcomes. This is the subject of the following chapters.

Chapter 3: Foreign Aid and Government Effectiveness in Small States: Is Australia Different?

3.1 Introduction

3.1.1 Overview

This chapter seeks to address a number of questions. What impact does foreign aid have on improving the performance of recipient governments? Is technical assistance the most effective method of achieving these objectives? And, do any of the unique economic characteristics of SIDS make foreign assistance any less effective in these environments? Having addressed each of these questions, the chapter then seeks to determine whether Australia's specialisation in the delivery of aid—both in the form of technical assistance and to SIDS—has made it more, or less, successful at promoting the establishment of functioning and effective states.

This chapter refines and extends the previous literature on this topic by adopting more advanced estimation methods which better control for the endogenous explanatory variables and which control for persistence in institutional performance. Evidence is found to support the notion that the positive impact of aid on government effectiveness tends to diminish as countries decrease in population. The diminishing marginal returns to aid in population are shown to be most pronounced within the technical assistance component of aid. Each of these effects is also particularly significant within the Australian aid program.

The chapter is organised as follows. Section 3.1.2 discusses the role of aid and technical assistance as a method for donor countries to try and improve the performance of recipient governments. Section 3.1.3 discusses a number of reasons why these effects may be different in small vis-à-vis large countries. Section 3.1.4 provides an overview of aid and technical assistance in the SIDS of the South Pacific. Section 3.2 reviews the literature assessing the impact of foreign aid on the effectiveness of recipient governments and their policy performance. Section 3.3 illustrates the model to be estimated and Section 3.4 discusses a number of estimation and empirical issues. Section 3.5 describes the data whilst Section 3.5 provides the estimation results. Section 3.6 concludes and discusses some policy implications.

3.1.2 Foreign Aid, Technical Assistance and Government Effectiveness

The diversity of assistance offered by aid donors to help strengthen the quality of institutions in recipient countries reflects the equally diverse interpretation of what actually

comprises good governance (World Bank 2005; Rodrik 2006).[45] Kaufmann et al. (1999a; 1999b) have proposed what is perhaps the most widely used definition of governance, arguing that it reflects the combination of rules and institutions by which a country is administered. Governance, they say, includes a diverse range of factors—from the way in which governments are selected, monitored and replaced to the capacity of the government to effectively formulate and implement policies, and also the respect that citizens and the state have for the rules and institutions that govern political, social and economic interactions among them (Kaufmann et al. 1999a; Kaufmann et al. 1999b).

As discussed, the emergence of the governance agenda has had a large impact on the Australian aid program, in particular through a large increase in the proportion of its aid given as technical assistance. As was shown in Chart 2.2, the proportion of Australia's grant aid delivered through technical cooperation has steadily increased since the 1980s, from 12 per cent in 1981 to 50 per cent in 2006.[46] As a result, Australia now gives more aid in the form of technical assistance than any other major bilateral aid donor (OECD DAC 2008).

Foreign aid has, however, been widely criticised on the grounds that it undermines rather than supports institutional strengthening efforts. Rodrik (1996:31), for example, argues that whilst aid funds can provide resources for useful economic reforms, they can also help perpetuate bad economic policy by reducing the costs of 'doing nothing'. Aid has also been widely associated with undermining domestic revenue collection as recipients find it more politically appealing to extract resources from donors than to increase taxes on their constituents. This not only depletes domestically generated resources but creates a dependency on continued aid flows and donor assistance which can support rent-seeking behaviour by the recipient government (Bauer 1971; Svensson 2000; Easterly 2002). Critics also argue that by providing essential public services, aid has the potential to weaken the recipient government's economic and social management responsibilities contributing to what Djankov et al. (2008:193) term the 'curse of aid', whereby aid dependency leads to a deterioration of democratic institutions.

[45] In 2007–08 major expenditure items for Australia's institutional strengthening efforts within the South Pacific included government administration (A$267 million), legal and judicial areas (A$155 million), economic policy (A$109 million), civil society (A$64 million) and public sector financial policy and management (A$70 million) (AusAID 2008:14).

[46] Globally, the proportion of ODA from all DAC donors has followed a different trend, increasing from 10 per cent of all ODA in 1960 to a peak of 25 per cent in 1974. This proportion then remained at a relatively stable 20 per cent of ODA until the late 1990s when it increased to 25 per cent of all ODA. Most recently, as total aid flows have increased rapidly post 2002, the proportion of technical assistance has declined to approximately 15 per cent, reflecting in part the large amount of ODA allocated as debt relief under the HIPC Initiatives (OECD DAC 2008). See Chart 3.2 in Appendix 3.1.

A large subset of the criticisms of foreign aid's impact on government performance has also been focused specifically on the delivery of technical assistance. As early as the mid 1990s, dissatisfaction with technical assistance began to emerge within the World Bank's Operations and Evaluations Department, where a major review found that '[o]utcomes have varied widely but the overall efficacy and cost effectiveness of technical assistance has been disappointing' (World Bank 1996:4). Central to these criticisms is the claim that the key goal of technical assistance to make itself superfluous by establishing independent, functioning institutions and structures has very rarely, if ever, been achieved. Instead, critics argue, advisors tend to embed themselves within local institutional structures leaving a 'capacity gap' upon their departure (Klingebiel 1999:42).

Similar scepticism of the ability of aid and technical assistance efforts to improve institutional performance has been shown about the Australian aid program. The 2007 Annual Review of Development Effectiveness by AusAID cites that a 'recent review of economic technical assistance in the Pacific region found that country officials, mainly at a high level, were overburdened with visits by staff of international and bilateral agencies and their consultants on TA [technical assistance] assignments' (ODE 2008b:32).[47]

Australia's focus on technical assistance has also led to a growing sense of frustration on the recipient side. Former PNG Prime Minister and now Parliamentary Opposition Leader Sir Mekere Morata responded to a March 2008 visit to PNG by Australian Prime Minister Kevin Rudd by calling for an overhaul of the aid program claiming that '[h]undreds of millions have been spent or are being spent on capacity building, but nothing really has eventuated' (Marshall 2008:1). Powles (2006), too, argues that in the case of the Solomon Islands, a culture of dependency has emerged as a result of technical assistance, with many locals letting the deployed officers take the lead in reform efforts. The author argues this culture is being perpetuated by deployed officers who often find it easier to complete tasks themselves rather than letting locals take the lead, generally as a result of time pressures. This in effect has been 'subverting the very people whose capacity is supposedly being built' (Powles 2006:11).[48]

---

[47] ODE (2008b) also quotes: 'An independent completion report of a multimillion-dollar health program in PNG notes that:... the high volume of support personnel and the enthusiasm they have brought has resulted, at national level, in a perception that ... there has been too much technical assistance, resulting in at best duplication of effort, and at worst, suppression of activity and adverse consequences for ownership and optimism.'

[48] These constraints are also amplified in many cases by a lack of domestic ownership over specific capacity-building activities. For example, Land (2007:12) argues that: 'the Solomon Islands provides an example of a country that is "more a taker rather than shaper of its external assistance". Political instability and fragility, a poor record of success with external assistance (Technical Assistance, in

3.1.3 Is the Impact of Aid and Technical Assistance Different in SIDS?

In addition to being the largest relative provider of technical assistance, the focus of Australian aid on the South Pacific means that it also gives a large portion of its aid budget to small states. In 2007 for example, Australia gave bilateral assistance to 83 countries, 19 of which had a population of fewer than 2 million people, and 18 of which are members of the SIDS grouping. Furthermore, despite the SIDS grouping accounting for just 0.41 per cent of the total population of all Australian aid recipients, the group received an average of 35 per cent of total Australian aid between 2003 and 2007 (see Appendix 3.2).

As mentioned, SIDS face a number of unique economic challenges. They tend to be categorised by limited resource endowments and narrow production bases (Read 2007:5), often leading to a high dependence on international trade. When combined with their exposure to both natural and external shocks, this has led to unstable foreign exchange earnings and volatile economic activity (McGillivray et al. 2008). The economic costs of these disadvantages have also tended to be amplified by remoteness to major international markets and limited scale economies, leading to high per-unit transportation costs (McGillivray et al. 2008:482).

In addition to economic challenges, SIDS also face a number of unique characteristics which can impact on their ability to develop well functioning bureaucracies. For example, the small size of SIDS public sectors means decision-making authority often rests in the hands of relatively few actors. This leads to lower levels of consensus decision making within government, which in turn can erode the buy-in of other actors to reform processes (Warrington 1994). The small absolute size of bureaucracies also has implications for recruitment and promotion decisions, which tend to be more influenced by personal patronage and social alliances than performance (Farrugia 1993). Scale disadvantages extend to the delivery of services—small states are expected to provide the same range of public goods as larger countries despite their high cost when spread across a relatively small population (Jacobs 1975). These effects have been shown to be particularly pronounced when services have to be delivered in remote and island locations common to the many archipelagic SIDS (Baker 1992).

---

particular), as well as a lack of personnel to attend to policy and planning matters seem to be factors that have encouraged a lack of engagement.'

The small size of the bureaucracy also means that senior civil servants are expected to cover a much wider range of issues, leading to a lack of specialist knowledge in many areas of the administration (Liiv 2002). Studies have also shown that the limited private sector opportunities in SIDS combined with patronage-based promotion have meant that entrepreneurship is generally not pursued by public sector employees (Streeton 1993). This has led to a heavy focus on carrying out routine administration tasks, a resistance to public sector reform and a tendency for not making decisions which may jeopardise future career aspirations.

Despite the plethora of studies analysing the unique economic and administrative challenges facing SIDS, little attention has been paid to whether these characteristics can impact the effectiveness of foreign aid at improving institutional quality in these environments.

Lower absolute levels of institutional capacity may, for example, amplify the negative impact of migrating bureaucratic resources towards dealing with donors—with program design, monitoring and evaluation, and coordination efforts all soaking up scarce institutional capacity. Limited institutional resources in SIDS also mean that they may have a lower ability to enforce donor harmonisation policies, which further adds to the excessive burden placed on their bureaucracy.

A desire by domestic civil servants to maintain their important patronage relationships, both within the bureaucracy and within government, may also mean that they are less willing to draw on technical assistance to pursue public sector reform efforts. This can leave technical advisers as isolated agents of change when placed in recipient bureaucracies, amplifying the well-known tendency of technical assistance to 'crowd out' rather than 'crowd in' bureaucratic capacity.

Donors also have a tendency to offer higher per capita levels of aid to SIDS which makes them more aid dependent than larger recipients. When combined with their limited institutional resources, this dependency may result in a decreased ability to effectively push back on the objectives of donors. Over the longer term, this situation may lead to a lower level of country ownership amongst domestic recipients, something that is now widely regarded as a key success factor in aid projects (Drazen 2002:2).

3.1.4 Impact of Aid on Government Effectiveness in the South Pacific

These policy challenges may help to explain why, despite significant aid flows and in particular technical assistance, the governments of the South Pacific continue to perform poorly. Table 3.1 shows very high levels of foreign aid per capita across all of the SIDS of the South Pacific ranging from an average of US$5,100 per capita in Niue to US$54 per capita in PNG. Because of its larger population, PNG is the outlier within this group, with all others receiving average aid per capita flows well above US$100 per capita per annum between 1996 and 2006. For many of these countries, technical assistance has been the dominant form of aid given during this period. Of the major recipients of Australian aid, Vanuatu was the one to receive the highest proportion as technical assistance—71 per cent. Likewise, Samoa received 64 per cent, Fiji and Tonga received 63 per cent, Solomon Islands received 62 per cent, Cook Islands received 59 per cent and PNG received exactly half of its aid through technical assistance. Australia has been the dominant donor in many of these Pacific countries, particularly those from Melanesia. Amongst the highest proportions are Nauru and PNG, which received 84 per cent and 79 per cent of their aid from Australia, respectively. In the Solomon Islands, this proportion was 55 per cent whilst Vanuatu and Fiji received 38 per cent and 29 per cent, respectively.

Table 3.1: Key Indicators for Pacific Island Countries (1996–2006)

	Growth GDP pc$^{\Psi}$	ODA$^{\Phi}$	ODA$^{\Phi}$	TA ODA$^{\Phi}$		Australian ODA$^{\Phi}$		GDPpc$^{\Omega}$	Pop$^{\Pi}$	GE$^{\varrho}$	Δ GE
	1996-2006	US$m	per capita US$	per capita US$	% total	per capita US$	% total	'000sUS$	'000s	Index	Δ Index
Cook Is.	6.05	5.89	312.58	185.90	0.59	65.63	0.21	12.88	19	0.5	0.40
Fiji	0.51	43.48	51.97	32.79	0.63	14.99	0.29	4.92	875	-0.1	0.00
Kiribati	1.40	17.03	183.20	97.62	0.53	59.11	0.32	1.42	100	-0.5	-0.20
Micronesia	-0.77	101.90	945.13	64.85	0.07	9.58	0.01	3.85	109	-0.1	0.50
Nauru	2.51	7.65	668.07	75.95	0.11	559.89	0.84	6.98	11	-0.4	0.80
Niue	-	7.52	5,137.40	845.29	0.16	679.60	0.13	-	1	-0.4	0.40
Palau	-0.15	39.24	2,122.00	213.48	0.10	19.32	0.01	9.55	19	-0.8	-0.50
PNG	0.88	265.93	53.80	27.06	0.50	42.45	0.79	4.49	5,404	-1	-0.70
Samoa	4.16	31.20	173.79	111.70	0.64	50.60	0.29	3.46	179	0.3	0.70
Solomon Is.	-4.09	69.60	141.57	87.19	0.62	78.27	0.55	1.73	530	-0.7	0.30
E. Timor	0.80	132.06	156.34	60.63	0.39	40.46	0.26	0.36	983	-0.9	0.00
Tonga	-1.65	22.69	220.83	140.12	0.63	66.92	0.30	3.20	108	-0.5	-0.30
Tuvalu	-	7.58	731.70	303.50	0.41	193.89	0.26	2.82	11	0	-0.50
Vanuatu	0.56	32.20	168.25	118.92	0.71	63.67	0.38	3.01	203	-0.3	-0.10

Ψ Average growth in real GDP per capita from 1996 to 2006. **Source:** PWT (2007) and ADB Key Indicators (2008). See Appendix 3.4.
Φ Average ODA disbursements from 1996 to 2006. **Source:** OECD DAC (2008).
Ω 2006 real GDP per capita in US$. **Source:** PWT (2007) and ADB Key Indicators (2008). See Appendix 3.4.
Π Total population in thousands. **Source:** See Appendix 3.4.
ϱ Government Effectiveness Index ranging from -2.5 (poor) to 2.5 (good). See text for a full explanation. Δ Index represents the absolute change in the Index between 1996 and 2006. **Source:** Kaufmann et al. (2007).

Based on the definition of governance discussed earlier, Kauffman et al. (2007) provide a perceptions-based index of government effectiveness, giving each country a normalised score of between -2.5 (poor) and 2.5 (good).[49] This index shows that despite a plentiful supply of foreign aid and technical assistance Kiribati, Fiji, East Timor, Palau, PNG, Tonga, Tuvalu and Vanuatu have all either worsened or remained unchanged in terms of their government effectiveness between 1996 and 2006. In addition, despite being the biggest recipient of financial assistance in aggregate terms, PNG was the worst performer during this period, with its index declining from -0.3 to -1. Nauru, on the other hand, made the biggest improvement across the decade, increasing its score by 0.8—albeit retaining a negative rating. In fact, the only two countries in the Pacific to have positive values on their governance index in 2006 were Samoa and the Cook Islands, with scores of 0.3 and 0.5 respectively.

Continued poor government performance despite high levels of foreign aid and technical assistance present a number of important questions for the effectiveness and design of the Australian aid program as it attempts to establish functioning and effective states within the South Pacific region. This remainder of this chapter seeks to empirically determine what impact foreign aid has on the effectiveness of governments and whether technical assistance is the best way to improve this effectiveness. In addition, it focuses on whether any of these effects vary according to the size of the recipient and whether Australia's specialisation in technical assistance to small states has made it more effective vis-à-vis other donors in these environments.

3.2 Literature Review

3.2.1. Past Studies

Knack (1999) was one of the first authors to study how foreign aid impacts on government performance, combining measures of bureaucratic quality, rule of law and corruption into a single index. Covering a sample of 80 countries between 1982 and 1995, the author finds that higher levels of aid have tended to erode the quality of governance in recipient countries. This result was supported by Svennsson (2000) who provides a game theoretic illustration of the interaction between powerful competing social groups in response to an aid flow injection—showing that foreign aid is linked with higher levels of government

[49] This index was originally constructed in Kaufmann et al. (1999b) and uses an unobserved components methodology to aggregate a large number of governance measures into six aggregate indicators corresponding to six dimensions of governance. These include voice and accountability, political stability, government effectiveness, regulatory burden, rule of law, and corruption, offering the most comprehensive data set on government performance covering 212 countries between 1996 and 2006.

regulation, rent-seeking behaviour and corruption. This hypothesis is then supported with empirical evidence for a panel of countries between 1980 and 1994, showing that aid has been associated with higher levels of corruption.

Brautigam and Knack (2004) also support these findings by contending that foreign aid creates a substantial moral hazard problem for both donor and recipient which lowers local pressures for economic reform and reduces accountability mechanisms within the economy. The authors then present empirical evidence from a panel of sub-Saharan African countries between 1982 to 1997, showing a robust statistical relationship between high aid levels in Africa and deteriorations in governance.[50]

These results were supported by Djankov et al. (2008) who argue that foreign aid has an overall negative effect on democracy because it encourages politicians to engage in rent-seeking behaviour similar to that documented in the resource revenue windfall (or resource curse) literature.[51] Using panel data for 108 recipient countries between 1960 and 1999, the authors compare the effects of both aid and oil revenue inflows on institutions. They find that whilst both have had a negative impact on institutional quality, the effect of aid is a much larger curse than that of oil.

Celasun and Walliser (2005) then try and determine why this negative relationship between foreign aid and government performance exists—focussing on the impact of aid on fiscal policy in a cross section of eight African countries between 1994 and 2004. The key finding of their paper is that the volatility of foreign aid flows have contributed to perverse policy effects as recipient governments struggle to maintain fiscal discipline in the face of uncertain revenue streams. Knack and Rahman (2004) also try and explain the negative aid–governance relationship by examining the role of donor fragmentation using an index of bureaucratic quality available for recipient nations between 1982 and 2001. These authors find that high levels of donor fragmentation tend to have a particularly large negative effect on bureaucratic quality and capacity in recipient countries because the plethora of donors put pressure on government bureaucracies to satisfy their own reporting and evaluation requirements.

---

[50] One particularly important manifestation of eroding governance identified in their paper is the similarly strong relationship between higher aid levels and a lower tax share of GDP, creating a situation of perpetual aid dependency (Brautigam and Knack 2004).

[51] In this process, politicians attempt to isolate other political elite from these resources so their constituents can receive a disproportionate benefit. Political institutions then become less representative and less democratic (Djankov et al. 2008).

Heckelman and Knack (2005) analyse the impact of foreign aid on the capacity of governments to engage in market liberalising reform, which they measure using the World Bank's CPIA Index.[52] After conducting a variety of cross-country regressions, they find that between 1980 and 2000, countries which received higher levels of foreign aid were less likely to engage in market liberalising economic reform, although the effect appears to differ across policy type and was much larger in the 1980s than the 1990s.[53]

The only study to date which directly addresses the potential for differential impacts of foreign aid on economic policy performance on the basis of recipient population size has been that by Bowman and Chand (2007). By controlling for this difference, their paper finds that the negative impacts of foreign aid on economic policy performance increases as countries decrease in size— with larger countries typically receiving positive impacts of aid but countries with populations of less than 1.4 million receiving overall negative effects. Additionally, an evaluation of donor assistance efforts in Fiji led the authors to conclude that 'power asymmetries were behind many of the failed programs in the Pacific, that overloaded officials had little understanding of their own Ministry as a result of the competing demands of donors and an unstable political environment' (Bowman and Chand 2007:19).

3.2.2 Research Gap

To determine whether a country's size influences the effectiveness of foreign aid at improving bureaucratic and government performance this chapter extends the empirical analysis of Bowman and Chand (2007). In particular, it seeks to overcome a number of empirical limitations which constrained the reliability of their results. This includes insignificant Two Stage Least Squares (2SLS) estimates which attempted to control for the endogeneity between poor institutional performance and the potential to receive higher aid flows, as well as a sample of countries which only included a limited number of small states. This chapter compiles a much larger panel of data, which is estimated with a more

[52] A number of studies have criticised the use of the CPIA as a measure of policy and institutional quality, focusing on the lack of transparency and objectivity in its calculation and the arbitrariness of the selection and weighting of the indicators, which combine both some indicators that could be taken as a reflection of government commitment and effort, and those that reflect structural weaknesses in the institutional environment' (Kotoglou and Jones 2005:5).

[53] After disaggregating the policy reform variable, the authors also reveal that this effect varies across the sub-components of the economic freedom index. For example, while on the one hand foreign aid has had a significantly negative impact on access to sound money and the regulation of credit, labour and business, it has on the other hand had an insignificant impact on the size of government and freedom to exchange with foreigners.

robust instrumentation strategy employing both 2SLS and generalised method of moments (difference and systems) techniques.

This chapter also extends the literature by disaggregating aid flows to take account of the differential impacts of technical assistance vis-à-vis service delivery assistance on government performance. This approach seeks to determine, for example, whether the aid curse originates from technical assistance crowding out instead of crowding in bureaucratic capacity or whether providing aid-financed services undermines a recipient government's social management responsibilities. Finally, this chapter separates Australian aid flows vis-à-vis other donor aid flows to determine whether its specialisations have made it more, or less, successful at promoting the establishment of functioning and effective states.

3.3 The Model

The cross-country specification in Bowman and Chand (2007) posited that:

$$INS_{i,t} = \beta_1 + \beta_2 A_{i,t} + \beta_3 \ln P_{i,t} + \beta_4 (A_{i,t} / \ln P_{i,t}) + \beta' Z + \gamma_t + \varepsilon_{i,t} \qquad (3.1)$$
$$\forall \quad i = 1,2,...,N; \quad t = 1,2,...,T$$

where $INS_{i,t}$ represents the quality (effectiveness) of government in country i at period t, $A_{i,t}$ represents the average quantity of foreign aid received over the previous four years, γ_t is a series of time dummies and $\varepsilon_{i,t}$ satisfies the typical *i.i.d* assumptions. One core difference of this specification to that in the general literature is the inclusion of the $P_{i,t}$ term which measures the population (size) of the recipient country and an interaction term between aid and population, $A_{i,t} / \ln P_{i,t}$. The inclusion of these variables allows an explicit analysis of whether the effects of aid on government performance vary according to the size of the recipient such that the marginal impact of aid is given by solving $\frac{\partial INS_{i,t}}{\partial A_{i,t}} = \beta_2 + \beta_4 \cdot \frac{1}{\ln(pop_{i,t})} = 0$. Finally, the Z term is said to represent a vector of other explanatory variables drawn from the literature, including initial income per capita, access to major waterways, distance from the equator as well as a dummy variable measuring whether a country is deemed to be fragile.[54]

[54] Distance from the equator acts as a proxy for the various impacts of climate on institutional development and economic performance (Sachs 2003). Geographic proximity of the population to major waterways acts as a proxy for the impact of countries which have a higher proportion of their population close to major waterways and which are much more integrated into the global economy than

A key estimation issue is that the aid variable is potentially endogenous, with better institutional behaviour encouraging higher levels of aid which can create a positive bias in the impact of aid on government effectiveness (Knack 2000:9).[55] Two methods are utilised to control for this.

3.4 Estimation Method

3.4.1 Two Stage Least Squares

The first method to control for potential endogeneity is through the well known 2SLS technique which uses instrumental variables to identify exogenous sources of variation in the explanatory aid variables. In the first stage of the procedure, this involves the estimation of:

$$A_{i,t} = \alpha_0 + \alpha \cdot \mathrm{X}_{i,t} + \nu_{i,t} \tag{3.2}$$

where $\mathrm{X}_{i,t}$ is a vector of variables which are exogenous with $INS_{i,t}$ but which are plausibly correlated with foreign aid (Wooldridge 2000:461). That is, in the estimation of (3.1) and (3.2):

$$Corr(\mathrm{X}_{i,t}, A_{i,t}) \neq 0 \tag{3.3}$$

$$Corr(\mathrm{X}_{i,t}, \varepsilon_{i,t}) = 0 \tag{3.4}$$

In the first instance this chapter also adopts the 2SLS technique and follows the aid and governance literature with the introduction of ten-year lagged values of real GDP per capita and population levels as instruments (see, for example, Coviello and Islam 2006:14).[56] In terms of estimating the impact of technical assistance vis-à-vis other aid flows, papers such as Coviello and Islam (2006:24) circumvented the need for a disaggregated aid instrumentation strategy by only including technical assistance aid as an explanatory term—and using the same set of instruments as they did for the total aid flows variable. Excluding non technical assistance aid flows, however (which often make up a dominant proportion of financial assistance), has the potential to introduce omitted

---

their landlocked counterparts (Gallup et al. 1999). The fragile states dummy variable is based on the World Bank's Country Policy and Institutional CPIA framework and controls for the growing recognition within the aid effectiveness literature that fragile states have unique challenges which may make them respond differently to financial assistance than countries with higher levels of governance capacity (Hjertholm and White 2004; AusAID 2005; OECD 2005).

[55] Aid allocation systems—such as the World Bank's International Development Association (IDA) loan allocations and the United States Millennium Challenge Account (MCA) grant allocations—determine how aid is allocated in part by subjective assessments of a recipient country's institutional performance.

[56] Each of the estimations was carried out using seven, eight and nine-year period lags as well and the results remained comparatively similar.

variable bias into the estimation procedure—particularly if one assumes that these other types of aid have the potential to impact on government effectiveness.[57]

To explain exogenous variations for heterogenous aid, this paper uses lagged values of aid flows as used by Clemens et al. (2004:17) and Dalgaard et al. (2004:204).[58] Choosing the appropriate lag period is important because past aid flows could influence current institutional quality. To an extent, this is controlled for by including the per capita GDP variable which measures the economic impacts of improved institutional quality. Additionally, as per previous instruments, a ten-year lag period is chosen, which is sufficiently long to ensure limited spill-over effects.

A number of tests are used to determine whether the instrumentation strategy satisfies the requirement of Equations (3.3–3.4). Staiger and Stock (1994) propose that as a rule of thumb, the first stage F-Statistics for each endogenous regressor should be above ten for the instruments to be sufficiently identified with the relevant endogenous explanatory variables.[59] Whilst this rule of thumb is still widely used in the literature (see Clemens et al. 2004; Knack and Rahman 2004; Coviello and Islam 2006;), its reliability can be questioned on the basis that it does not adjust the size of the critical F-Statistic for the number of included endogenous regressors or the number of instrumental variables. This has the potential to place a downward bias on the required critical F-Statistic value (Martina and Batten 2008).[60] This chapter draws on an improved test provided by Stock and Yogo (2002) and extended in Martina and Batten (2008) which adjusts the required F-Statistic critical value with respect to the number of endogenous variables and the number of instruments (see Appendix 3.6).

As the instrumentation strategy is over identified, it is also possible to test for instrument exogeneity. Consistent with the literature, the variance estimates in each case have been adjusted for heteroskedasticity robustness in the error terms according to the process

[57] In the event that other aid flows and technical assistance aid flows are highly positively correlated, the technical assistance coefficient may thus overstate the effect their impact has on governance outcomes.

[58] Dalgaard et al. (2004:204) demonstrate that '...the reduced form relation for aid shows that lagged observations of aid are highly correlated with aid in the presence of time invariant factors. As not all controls can be included in the reduced form, and because of the correlation between the regressors and the error, we cannot expect to estimate a coefficient of unity on lagged aid. However the reduced form shows that we should expect a high correlation between past and present aid.'

[59] Weak instruments are problematic because if the instruments are weakly correlated with the endogenous variables, a small correlation between these instruments and the disturbance term will produce a larger inconsistency in the instrumented regression estimates than in the non instrumented regression estimates (Staiger and Stock 1994:33).

[60] In cases where the number of instruments significantly exceeds the number of endogenous regressors (as is the case in this paper and within the literature generally), this will lead to a downward bias in the size of the first stage critical F-Statistic (see Appendix 3.5).

developed by White (1980). As such, the relevant test for instrument exogeneity is Hansen's J-Statistic and its associated Chi-Squared p-value (Baum et al. 2003:17). This is a test of the joint null hypothesis that the excluded instruments are valid, that is, uncorrelated with the error term and correctly excluded from the estimation equation, where a rejection casts doubt on the instrument's validity (Hayashi 2000:227).[61]

3.4.2 Difference-Generalised Method of Moments

In practice, finding truly exogenous instruments which satisfy Equation (3.3–3.4) has proven difficult in the aid effectiveness literature (Roodman 2007). Indeed, in Bowman and Chand (2007), poorly identified instruments led to insignificant 2SLS results for many of the core estimations. Another limitation of their paper is that it does not control for persistence in institutional performance, whereby initial institutional performance determines subsequent developments, as has been the case in much of the other existing literature (see Knack 2000; Coviello and Islam 2006). Given the dynamic structure of the data it is also important to control for country specific effects (fixed effects) in the estimation of Equation (3.1). In the presence of these country specific effects both the OLS and 2SLS estimates may be both biased and inconsistent since the lagged value of government effectiveness will be correlated with the error term.[62] To control for these issues this chapter also estimates an augmented version of Equation (3.1) which can be written as:

$$INS_{i,t} = \beta_0 + \beta_1 INS_{i,t-1} + \beta_2 A_{i,t} + \beta_3 lnP_{i,t} + \beta_4 (A_{i,t}/P_{i,t}) + \beta' Z + \gamma_t + \eta_i + \varepsilon_{i,t} \quad (3.5)$$

where η_i captures the country specific effects for all i countries in the sample and $INS_{i,t-1}$ represents the level of government performance in the previous period. The first differenced generalised method of moments (GMM) estimator developed by Arellano and

[61] The Hansen test of over identifying restrictions tests the joint null hypothesis that the instruments are valid, that is, uncorrelated with the error term, and that the excluded instruments are correctly excluded from the estimated equation. Under the null hypothesis, the test statistic is distributed as Chi-Squared in the number of over identifying restrictions. A rejection casts doubt on the validity of the instruments.

[62] In addition, it has been shown that this correlation cannot be removed as the number of countries in the sample increases or as the time period of estimation increases (Coviello and Islam 2006:22).

Bond (1991) is one method to estimate this specification.[63] In this case, the estimation of Equation (3.5) is carried out in first differences $(X_{i,t} - X_{i,t-1})$ such that:

$$\begin{aligned}\Delta INS_{i,t} = \beta_0 + \beta_1 \Delta INS_{i,t-1} + \beta_2 \Delta A_{i,t} + \beta_3 \Delta \ln P_{i,t} + \beta_4 \Delta (A_{i,t} / \ln P_{i,t}) \\ + \beta' \Delta Z + \Delta \gamma_t + \varepsilon_{i,t}\end{aligned} \tag{3.6}$$

where the country specific effects, η_i, are cancelled out by the difference operator. Difference-GMM also controls for the endogeneity of both the aid and government performance variables by using internal instruments, which are based on the lagged values of each of the endogenous explanatory variables (Coviello and Islam 2006:23). For a consistent estimation, however, it is required that $\varepsilon_{i,t}$ have the typical *i.i.d* properties and each explanatory variable satisfy an assumption of weak exogeneity. This weak exogeneity requires that variables must be uncorrelated with future unanticipated shocks to the dependent variable but could be influenced by both past and present levels of government effectiveness—which means that they are uncorrelated with $\varepsilon_{i,t}$ such that:

$$\begin{aligned} E[INS_{i,t-s}(\varepsilon_{i,t} - \varepsilon_{i,t-s})] = 0 \\ E[Z^*_{i,t-s}(\varepsilon_{i,t} - \varepsilon_{i,t-s})] = 0 \end{aligned} \quad \forall \quad t = 3,...,T; \quad s \geq 2 \tag{3.7}$$

where T is the number of time periods in the sample and Z^* represents the vector of all the weakly exogenous explanatory variables.

3.4.3 System-Generalised Methods Moments

Bond et al. (2001) show however that when estimating persistent time series (such as measures of government effectiveness), the first-differenced GMM estimator can be poorly behaved since lagged levels of the series provide only weak instruments for subsequent first differences.[64] A solution to this problem is provided by Arellano and Bover (1995) and Blundell and Bond (1997) who develop an estimator known as System-GMM. The System-GMM approach also uses lagged values of the dependent and independent variables as internal instruments but these are derived from the estimation of a system of two simultaneous equations. The first is in levels with lagged first differences as instruments

[63] It is worth noting that a whilst a simple fixed effects panel data approach to estimating Equation (3.5) would account for the existence of country specific effects, the coefficient estimates will still remain biased because of the presence of the lagged dependent variable. In addition, the fixed-effects estimator would remove a number of control variables which are also of interest, such as the fragile states dummy variable, as they are time invariant; hence the focus on GMM estimation procedures.

[64] In particular, when the dependent variable follows a path close to a random walk, the Differenced-GMM has poor finite sample properties, and it is downwards biased, especially when the number of periods within the estimation is small (Presbitero 2006:6).

and the second is in first differences with lagged levels as instruments (Presbitero 2006:6). This approach more accurately addresses the issue of weak instrumentation which occurs with the first differenced GMM estimations when estimating highly persistent series with System-GMM (Elbadawi et al. 2007:15).

The System-GMM procedure requires both the original orthogonality conditions of the first differenced GMM estimator (Equation 3.7) as well as several more assumptions to be in place. The first is that the equation in differences has no correlation between the differences of the variables and the country specific effects[65] such that:

$$\begin{aligned} &E[(INS_{i,t+\kappa} - INS_{i,t+q})\eta_i] = 0 \\ &E[(Z^*_{i,t+\kappa} - Z^*_{i,t+q})\eta_i] = 0 \qquad \forall\, \kappa, q \end{aligned} \tag{3.8}$$

For the equation in levels, two additional moment conditions are required which ensure that the internal instruments gain a sufficient degree of identification with the dependent government effectiveness variable, given its highly persistent nature, such that:

$$\begin{aligned} &E[(INS_{i,t-s} - INS_{i,t-s-1})(\eta_i + \varepsilon_{i,t})] = 0 \\ &E[(Z^*_{i,t-s} - Z^*_{i,t-s-1})(\eta_i + \varepsilon_{i,t})] = 0 \qquad s = 1 \end{aligned} \tag{3.9}$$

A downside of using the System-GMM procedure is that whilst the estimators are asymptotically robust, they are known to have very poor finite sample properties leading to a downwards bias in the standard error estimates (Roodman 2006:1). This issue is addressed by using the finite sample correction proposed by Windmeijer (2005) which produces standard errors that are asymptotically robust to both heteroskedasticity and serial correlation.

As outlined in Blundel and Bond (1998), the Hansen/Sargan test of over identifying restrictions is reported in all of the GMM estimations for the null hypothesis of instrument validity. Failure to reject the null hypothesis gives support to the model.[66] The Arellano-Bond test statistic is also used to examine the null hypothesis that the error term is not serially correlated. The values reported are the p-values for first, AR (1), and second, AR

[65] This implies that the system is stationary and that temporary deviations from the steady state value are uncorrelated with the fixed effects (Djankov et al. 2008:184).

[66] For each of the robust estimations, Hansen's J-Statistic is presented instead of the Sargan Statistic. Both tests have the same null hypothesis.

(2), order auto correlated disturbances in the first differenced equations.[67] As per Coviello and Islam (2006), each model's lag structure and its subsequent instrumentation strategy is determined by assessing the best combination of test results. Given the large number of endogenous variables considered in the disaggregated models, to avoid the problem of over fitting the model by including more instruments than there are country clusters in the sample (Roodman 2006), the lag length is restricted to no greater than three.

3.5 Data

This chapter measures the performance of government with the data set constructed by Kauffmann et al. (2007). This is the most comprehensive data set available on government performance, covering 212 countries between 1996 and 2006. The data set also includes a large number of SIDS which are typically excluded from governance indicator data sets. The government effectiveness index is chosen as the core dependent variable as it is deemed to best reflect the overall governance environment facing a recipient country. It measures perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies (Kaufmann et al. 2009:6). One limitation of the Kauffman et al. (2009) governance indicators is the significant margins of error which are present within individual country rankings. These margins of error plague all data collection efforts and in particular those that rely on perceptions based indices. It is for this reason that the data is used to make broad cross country comparisons of the impact of foreign aid on institutional performance rather than to assess the comparative performance of specific countries at, or across, specific points in time. This indicator is measured in units ranging from -2.5 to 2.5, with higher values corresponding to better governance outcomes. Unrecorded values for 1997, 1999 and 2001 are linearly extrapolated from adjoining years.[68]

GDP per capita data is taken from the Penn World Tables (PWT) v6.2 and is expressed in the natural logarithm of constant US$. Population data is also taken from the PWT and measured in thousands of people. As in the previous chapter, foreign aid is measured as

[67] A failure to reject the null hypothesis gives support to the model. Rejecting the null hypothesis indicates a need for higher-order lags of the variables to be used as instruments.

[68] These results were also carried out using the economic policy performance index and each of its sub-components compiled by the Heritage Foundation as was used in Bowman and Chand (2007). In terms of aggregate aid and technical assistance flows, the results were comparatively similar; however, the limited number of small countries available in this sample raised concerns over the result's robustness. In addition, the limited number of South Pacific countries available meant that it was not possible to conduct a robust analysis of Australian aid flows.

total net ODA and Technical Assistance flows are as described in Appendix 3.4. Data for both aid variables are taken from the OECD DAC (2008) for Australia and all other donors and measured in current US$. This data is then converted into real purchasing power parity terms using the PWT GDP deflator and expressed as a proportion of real GDP averaged over a four-year period. Whilst split between technical assistance and total ODA it is important to note that not all of these aid funds are provided directly at improing the policy environment. As such, this has the potential to place a downward bias on the coefficient estimates of the impact of ODA on government effectiveness. This bias is likely to be reduced with the usage of the technical assistance variable as this type of aid tends to have a larger proportion aimed directly at improving policy performance. Nevertheless, this type of aggregation bias remains a limitation of the approach, and as shall be discused in the concluding section offers a potential avenue for further research.

Distance from the equator is measured as the absolute value of latitude in degrees from the equator and is sourced from Rodrik et al. (2004). Geographic proximity to major waterways is taken from Gallup et al. (1999) and measures the total proportion of a country's population within 100km of a major waterway. The fragile states dummy is sourced from Chauvet and Collier (2007) and calculated from the World Bank's definition of fragile states, which includes low income countries scoring 3.2 and below on the World Bank's CPIA index (see Appendix 3.3 for a list of countries). To fill in missing data for a number of South Pacific countries, data was collected from a variety of regional sources including PRISM. A full list and explanation of these additions can be found in Appendix 3.4. The summary statistics for each of these core variables are displayed below in Table 3.2.

Amongst the sample of countries used in this chapter, Micronesia was the biggest aid recipient receiving a mean value of financial assistance equal to 27.8 per cent of its GDP between 1996 and 2005, followed closely by Liberia with 27.4 per cent of its GDP. Chile recorded the highest value for government effectiveness amongst the aid recipient sample with a value of 1.4 in 1998, whilst the Solomon Islands recorded the lowest value with a score of -2.5 in 2003. The total sample thus comprises an unbalanced panel of 1,234 observations from 112 recipient countries, including nine from the South Pacific (see Appendix 3.5).

Table 3.2: Summary Statistics—Total Sample (1996–2005)

Variable	Label	Obs	Mean	Std Dev	Min	Max
Government Effectiveness	GE	1,234	-0.481	0.658	-2.5	1.4
Population	Pop	1,234	46,283	160,829	10.065	1,294,843
GDP Per Capita	GDPpc	1,234	4.221	4.239	0.187	30.494
Distance from the Equator	Disteq	1,234	17.673	12.243	0	47
Access to Waterways	Pop100km	1,234	0.479	0.389	0	1
Fragile States Dummy	Fragile	1,234	0.281	0.450	0	1
ODA*	ODAGDP	1,234	2.147	3.417	0.004	27.813
Technical Assistance ODA	TechGDP	1,234	0.710	1.183	0.001	8.911
Non Technical Assistance ODA	ResGDP	1,234	1.437	2.676	0	26.078
Australian ODA	AusODAGDP	1,234	0.167	0.706	0	9.330
Australian Technical Assistance ODA	AusTechGDP	1,234	0.127	0.564	0	8.279
Australian Non Technical Assistance ODA	AusResGDP	1,234	0.040	0.188	0	2.358
Non Australian ODA	OthODAGDP	1,234	1.981	3.167	0	27.607
Non Australian Technical Assistance ODA	OthTechGDP	1,234	0.583	0.795	0	6.107
Non Australian non Technical Assistance ODA	OthResGDP	1,234	1.397	2.643	0	26.011
Distance from the Equator	Dist	1,234	12,143	3,715	2,717	17,807
British Colony	Brcol	1,234	0.361	0.481	0	1

*All ODA variables measured as a proportion of GDP.

3.6 Results

3.6.1 Aid and Government Effectiveness in Small States

As a point of comparison with the existing literature, Table 3.3 reports the results of the estimation of Equation (3.1) in column 1 and 2. Columns 3–5 report the results of the estimation of the preferred core specification, Equation (3.5). All estimations measure the impact of total ODA flows on government effectiveness.

Column 1 and 2 use pooled OLS and 2SLS estimators respectively, both with country-clustered and White's (1980) heteroskedasticity robust standard errors. Column 3 uses the Difference-GMM estimator shown in Equation (3.7), column 4 uses the System-GMM estimator and column 5 uses the System-GMM estimator with standard errors adjusted according to the process developed by Windmeijer (2005). All GMM estimations are carried out using the xtabond2 STATA command developed by Roodman (2006).

Table 3.3: Impact of ODA on Government Effectiveness

	(1) Pooled OLS– Cluster Robust	(2) 2SLS– Cluster Robust	(3) Diff-GMM	(4) Sys-GMM	(5) Sys-GMM Robust
lnpop	0.001	0.061	0.163	-0.002	0.001
	(0.009)	(0.038)	(0.091)*	(0.005)	(0.006)
lny	0.430	0.097	0.150	0.096	0.101
	(0.025)***	(0.024)***	(0.071)**	(0.026)***	(0.028)***
disteq	-0.001	0.005	-0.008	-0.001	-0.001
	(0.001)	(0.005)	(0.016)	(0.001)	(0.001)
pop100km	0.084	0.028		0.003	0.003
	(0.050)*	(0.172)		(0.033)	(0.042)
fragile	-0.292	-0.347	-0.111	-0.098	-0.087
	(0.041)***	(0.093)***	(0.088)	(0.037)***	(0.035)**
odagdp	0.054	0.069	0.005	0.033	0.032
	(0.022)**	(0.114)	(0.033)	(0.017)*	(0.019)*
odagdp/ln(pop)	-0.254	-0.040	0.216	-0.154	-0.150
	(0.103)**	(0.444)	(0.253)	(0.082)*	(0.086)*
L.ge			0.254	0.801	0.806
			(0.039)***	(0.046)***	(0.045)***
Constant	-0.995	-1.755		-0.166	-0.183
	(0.126)***	(0.598)***		(0.071)**	(0.075)**
Observations	1,234	837	908	1051	1051
R-squared	0.487				
$\beta_2+\beta_4\cdot\frac{1}{\ln(pop_{i,t})}=0$	111	-	-	106	108
Number of code	152	152	140	143	143
1st Stage F-Statistics					
ODA		32.94			
ODA/lnpop		93.37			
Hansen J-Stat		0.266			
Chi² P-Value		(0.875)			
Sargan/Hansen Test			89.41	107.72	107.72
Chi² P-Value			(0.000)	(0.012)	(0.012)
AR(1) P-value			0.002	0.004	0.000
AR(2) P-value			0.023	0.011	0.012

* Significant at 10%; ** Significant at 5%; ***Ssignificant at 1%. OLS and 2SLS estimations show White (1980) heteroskedasticity-robust and country clustered standard errors in parentheses. GMM standard errors are as described in main text. First stage F-Statistics from 2SLS estimations are well above the thresholds shown in Appendix 3.6, and the null hypothesis that the excluded instruments are valid through Hansen's J-Statistic test is not rejected within a 99 per cent confidence interval.

The results offer clear support for the notion that the impact of aid varies according to the size of the recipient. Firstly, column 1 shows a significant and positive coefficient for the ODA variable and a significant negative coefficient for the ODA and population interaction term, supporting the results of Bowman and Chand (2007). These results do, however, become insignificant in the 2SLS estimation although the sign of the coefficients remains unchanged, potentially reflecting a weak instrumentation strategy.

The Difference-GMM estimator shown in column 3 presents the only deviation from these results, with both the ODA and ODA interaction term recording positive coefficients, although neither is significant. Estimating the model by using the System-GMM procedure with both unadjusted and robust standard errors shows, however, a positive impact of ODA on government effectiveness which declines as recipients decrease in size. Estimates

for the point at which the effect of aid on government effectiveness turns negative have a relatively small range of between 106,000 and 111,000 people.

Other notable results are that the natural logarithm of income per capita maintains a highly significant positively signed coefficient throughout all the estimations, suggesting that an increase in GDP per capita contributes to improvements in government effectiveness. Also as expected, the fragile states dummy is consistently highly significant and negatively signed, illustrating the persistence of poor governance once a country has obtained fragile status. Finally, in all the GMM estimations the lagged value of government effectiveness is positive and highly significant, suggesting that past institutional performance influences current performance. Other specifications within the literature which do not account for this persistence in institutional performance are thus likely to be biased.

For the core System-GMM estimations the Sargan/Hansen test does not reject the null hypothesis of instrument validity, albeit at a relatively high, 99 per cent confidence interval. The Difference-GMM estimation does, however, appear to suffer from weak instruments, with the Hansen test rejecting the null hypothesis of instrument validity. This confirms the issue raised previously that when estimating persistent time series such as measures of government effectiveness, the first-differenced GMM estimator can behave poorly since lagged levels of the series provide only weak instruments for subsequent first differences (Bond et al. 2001). In each case, the null hypothesis of no serial correlation between the error term and the endogenous variables is not rejected at a 99 per cent confidence level for the AR (2) lag.

3.6.2 Technical Assistance and Government Effectiveness in Small States

Table 3.4 below reports the results of the estimation of Equation (3.1) in columns 6 and 7 and Equation (3.5) in columns 8 to 11. In this case, however, all estimations are made using two measures of ODA. The first measures the amount of technical assistance ODA whilst the second measures the amount of non technical assistance or 'residual' ODA. Both are accompanied by their respective population interaction terms.

The results provide substantial evidence for the fact that the dominant transmission mechanism for the diminishing marginal returns to aid in population size has been through the technical assistance component of ODA. Both the pooled OLS and 2SLS estimates of Equation (3.1) show that technical assistance has a significant positive impact on government effectiveness which diminishes as countries decrease in size, whilst the residual

ODA variable is negative and insignificant. Column 8 provides a robust System-GMM estimation with the inclusion of only technical assistance and the exclusion of the residual ODA variable, à la Coviello and Islam (2006:13) except with the inclusion of the interaction term. This estimation shows results that are comparatively similar to that in the previous two columns, although the size of the technical assistance coefficient decreases somewhat in size. This result supports the contention that not only does the size of the recipient reduce the effectiveness of foreign aid but that the costs of aid arise predominately from technical assistance.

Table 3.4: Impact of Technical Assistance on Government Effectiveness

	(6) Pooled OLS-Cluster Robust	(7) 2SLS-Cluster Robust	(8) GMM-System Robust	(9) GMM-Diff Robust	(10) GMM-System	(11) GMM-System Robust
lnpop	0.053	0.107	0.003	0.159	0.013	0.013
	(0.013)***	(0.038)***	(0.006)	(0.038)***	(0.004)***	(0.019)
lny	0.537	0.633	0.096	0.214	0.320	0.320
	(0.034)***	(0.137)***	(0.030)***	(0.040)***	(0.002)***	(0.053)***
disteq	0.001	-0.001	-0.001	0.003	-0.001	-0.001
	(0.002)	(0.004)	(0.001)	(0.018)	(0.001)**	(0.003)
pop100km	-0.077	-0.107	0.011	-	0.049	0.049
	(0.054)	(0.144)	(0.043)		(0.022)**	(0.105)
fragile	-0.139	-0.090	-0.095	-0.017	-0.221	-0.221
	(0.043)***	(0.102)	(0.034)***	(0.036)	(0.002)***	(0.072)***
odatechgdp	0.489	1.537	0.086	0.151	0.070	0.070
	(0.158)***	(0.680)**	(0.042)**	(0.040)***	(0.001)***	(0.094)
odatechgdp/ ln(pop)	-1.809	-6.426	-0.359	-0.657	-0.164	-0.164
	(0.696)***	(3.087)**	(0.202)*	(0.189)***	(0.005)***	(0.576)
odaresgdp	-0.013	-0.242	-	0.072	0.016	0.016
	(0.039)	(0.234)		(0.017)***	(0.001)***	(0.023)
odaresgdp/ ln(pop)	0.084	1.235	-	-0.239	-0.025	-0.025
	(0.188)	(1.083)		(0.080)***	(0.004)***	(0.108)
L.ge	-	-	0.797	0.040	0.254	0.254
			(0.047)***	(0.022)*	(0.001)***	(0.030)***
Constant	-1.822	-2.359	-0.215	-	-0.791	-0.791
	(0.185)***	(0.631)***	(0.075)***		(0.039)***	(0.222)***
Observations	855	853	1051	908	1051	1051
R-squared	0.510					
Number of code	112	112	143	140	143	143
$\beta_2+\beta_4\cdot\frac{1}{\ln(pop_{it})}=0$	40	65	64	77, 27	10, 4	-
1st Stage F-Statistics						
odatechgdp4		117.24				
odatechgdp4/ ln(pop)		41.81				
odaresgdp4		292.73				
odaresgdp4/ ln(pop)		85.27				
Hansen J-Statll		3.652				
Chi² P-Value		(0.161)				
Sargan/Hansen Test			114.24	40.91	126.92	126.92
Chi² P-Value			(0.004)	(0.227)	(0.192)	(0.192)
Arellano-Bond statistic						
AR(1) P-value			0.014	0.016	0.017	0.024
AR(2) P-value			0.001	0.002	0.002	0.002

* Significant at 10%; ** Significant at 5%; *** Significant at 1%. OLS and 2SLS estimations show White's heteroskedasticity-robust and country clustered standard errors in parentheses. GMM standard errors are as described in main text. First stage F-Statistics from 2SLS estimations are well above the thresholds shown in Appendix 3.6, and the null hypothesis that the excluded instruments are valid through Hansen's J-Statistic test is not rejected within a 99 per cent confidence interval.

The residual ODA variables are then included in the robust Difference-GMM estimation shown in column 9 with the sign and significance of the technical assistance results remaining unchanged. In this case, the residual ODA variable is also positively signed and significant whilst its interaction term is negative and significant. This result is then repeated with the System-GMM estimator and the results are shown in column 10; column 11 shows however the results are not robust when the Windmeijer (2005) standard error correction process is included.

The natural logarithm of income and the lagged dependent variable are again significant and positive throughout each of the estimations whilst the fragile states dummy continues to show a significant negative impact of the effectiveness of government. The natural logarithm of population variable is also positive and significant in four of the six estimations suggesting that, *ceteris paribus*, smaller countries tend to perform worse in terms of government effectiveness than their larger counterparts.

All the GMM estimations pass the Sargan/Hansen test except for those in column 8, which reject the null hypothesis of instrument validity at a 99.4 per cent confidence level. This may be due to omitted variable bias given that this is the under specified model which includes only technical assistance and not residual ODA flows—estimated as a point of comparison with previous studies which have adopted this approach. Nevertheless, the results remain consistent across all of the following estimations giving a greater degree of confidence to the findings. In each case, the null hypothesis of no first order serial correlation between the error term and the endogenous variables is not rejected at a 99 per cent confidence level.

3.6.3 Australian Aid and Government Effectiveness in Small States

Table 3.5 reports the results of the estimation of Equation (3.5) with aid flows disaggregated between Australia and all other donors. Columns 12–15 consider the impact of total Australian ODA vis-à-vis other ODA donors, whilst columns 15–18 further disaggregate these results into Australian technical assistance vis-à-vis other donors' technical assistance. All except the first two columns are accompanied with their respective population interaction terms. The results provide substantial evidence for the fact that the impact of small states on the effectiveness of aid has been particularly pronounced for the Australian aid program—especially through its technical assistance efforts.

Table 3.5: Impact of Australian ODA and Technical Assistance on Government Effectiveness

	(12) GMM-Diff	(13) GMM-System Robust	(14) GMM-Diff	(15) GMM-System Robust	(16) GMM-Diff	(17) GMM-System Robust	(18) GMM-Diff
L.ge	0.293	0.755	0.100	0.810	0.091	0.825	0.467
	(0.026)***	(0.044)***	(0.043)**	(0.041)***	(0.042)**	(0.036)***	(0.071)***
lnpop	0.118	0.001	0.139	-0.001	0.113	-0.001	0.108
	(0.069)*	(0.007)	(0.071)**	(0.005)	(0.071)	(0.004)	(0.073)
rgdpch	0.035	0.017	0.039	0.014	0.035	0.014	0.034
	(0.011)***	(0.004)***	(0.011)***	(0.003)***	(0.011)***	(0.003)***	(0.011)***
disteq	-0.026	-0.000	-0.010	-0.000	-0.012	-0.000	-0.022
	(0.018)	(0.001)	(0.018)	(0.001)	(0.018)	(0.001)	(0.018)
fragile	-0.121	-0.123	-0.137	-0.096	-0.135	-0.097	-0.113
	(0.045)***	(0.037)***	(0.042)***	(0.029)***	(0.041)***	(0.029)***	(0.045)**
pop100km	-	0.019	-	0.005	-	0.001	-
		(0.040)		(0.030)		(0.029)	
odaausgdp	0.093	0.026	0.421	0.113	-	-	-
	(0.019)***	(0.012)**	(0.227)*	(0.060)*			
odaausgdp/ ln(pop)	-	-	-2.336	-0.516	-	-	-
			(1.392)*	(0.303)*			
odaothgdp	0.012	-0.006	0.008	-0.020	-	-	-
	(0.006)*	(0.005)	(0.026)	(0.009)**			
odaothgdp/ ln(pop)	-	-	0.083	0.095	-	-	-
			(0.186)	(0.042)**			
odatechausgdp	-	-	-	-	0.763	0.194	1.084
					(0.320)**	(0.047)***	(0.353)***
odatechausgdp/ ln(pop)	-	-	-	-	-4.524	-0.811	-6.191
					(1.962)**	(0.284)***	(2.170)***
odaresausgdp	-	-	-	-	-0.114	-0.111	0.353
					(0.073)	(0.098)	(0.420)
odatechothgdp	-	-	-	-	0.125	-0.044	-0.018
					(0.087)	(0.054)	(0.102)
odatechothgdp/ ln(pop)	-	-	-	-	-0.357	0.265	0.382
					(0.471)	(0.277)	(0.584)
odaresothgdp	-	-	-	-	-0.000	-0.001	-0.012
					(0.010)	(0.002)	(0.030)
odaresausgdp/ ln(pop)	-	-	-	-	-	-	-2.331
							(2.126)
odaresothgdp/ ln(pop)	-	-	-	-	-	-	0.078
							(0.196)
Constant	-	-0.152	-	-0.106	-	-0.107	-
		(0.087)*		(0.063)*		(0.059)*	
Observations	934	1086	934	1086	934	1086	934
Number of code	149	152	149	152	149	152	149
$\beta_2 + \beta_4 \cdot \frac{1}{\ln(pop_{i,t})} = 0$			260	95	384	67	302
Sargan/Hansen Test	455.53	838.00	415.21	143.27	328.19	476.82	142.94
Chi2 P-Value	(0.000)	(0.000)	(0.000)	(0.362)	(0.000)	(0.000)	(0.439)
Arellano-Bond statistic							
AR(1) P-value	0.000	0.008	0.004	0.010	0.000	0.004	0.013
AR(2) P-value	0.000	0.001	0.000	0.001	0.000	0.000	0.002

* Significant at 10%; ** Significant at 5%; *** Significant at 1%. GMM standard errors are as described in the main text.

Column 12 and 13 use the Difference-GMM and robust System-GMM estimators respectively to estimate the impact of total Australian ODA and all other donor ODA on

the effectiveness of governments. Both estimations indicate that, *ceteris paribus*, Australian aid has had an overall positive impact on the performance of recipient governments. The other ODA variable also records a positive coefficient estimate for the Difference-GMM estimation, significant at a 90 per cent confidence interval.

Column 14 and 15 show the same two estimations with the inclusion of the population interaction terms. The results for Australian aid are again consistent with the previous two columns—the positive impact of aid on government effectiveness diminishes for smaller countries. In column 15, however, the System-GMM estimator records a negative coefficient estimate for the other ODA variable whilst its population interaction term is positive and significant. However, this effect is only moderately significant, not robust to the use of the Difference-GMM estimator in column 14, and, as shall be shown, not robust to a number of following estimations.[69]

Column 16 and 17 now disaggregate ODA into two, technical assistance and residual aid flows, for both donor categories. In this case, to reduce the number of endogenous variables within the model, the residual ODA variables are not interacted with population. Both sets of results show significant and positive coefficient estimates for the technical assistance variable whilst their population interaction term is significant and negative. The residual ODA variable and its interaction term on the other hand is insignificant in both estimations. This indicates that the dominant cause of the decreasing marginal effectiveness of Australian aid in small states has been technical assistance. The variables for the other donors are also insignificant in both estimations, suggesting that once the particularly pronounced effects of Australia are removed from the data, the diminishing marginal impact of technical assistance is, on average, less discernable within the data. As a final check for robustness, the residual ODA variables are interacted with population and estimated with the System-GMM in column 18. The results are comparatively similar and add further support to those obtained in the previous two columns.

A notable issue in these estimations is the failure of the Sargan/Hansen test statistic to confirm the instrument sets as valid, with the estimations shown in column 12, 13, 14, 16 and 17 all rejecting the null hypothesis of instrument validity at a 99 per cent confidence level. The failure of the test in this model is likely to represent the large number of

[69] The fragility of this result reduces its reliability and hence the overall concern that it raises for the general story that the impact of aid on government effectiveness decreases for smaller countries. Nevertheless, this is a counter-intuitive result and one that is at odds with the numerous other estimations shown in this chapter.

endogenous variables (given the high level of disaggregation of aid) and the weakness of the Sargan statistic when the number of instruments is close to, or greater than, the number of countries in the sample (Roodman 2006:14). The consistency and stability of the results across all the previous estimations and with the two sets of estimations made in column 15 and 18 which do pass the instrument validity test give some degree of confidence to these findings. Both estimations which do pass the Sargan/Hansen test also fail to reject the null hypothesis of no serial correlation between the error term and the endogenous variables–at a 99 per cent confidence level for the AR(1) lag. Nevertheless, the tests suggest that disaggregating aid into its type and its donor can lead to fragile results which should be treated with a degree of caution.

3.7 Discussion and Conclusion

This chapter has made a number of improvements to the literature assessing the impact of foreign aid on the performance of recipient governments. Firstly, it has focused on the potentially divergent impacts of aid in small countries vis-à-vis large countries. Secondly, it has distinguished between technical assistance and other types of aid delivery, reducing the potential for omitted variable bias as can be found in other papers in the literature. Thirdly, it has considered explicitly whether the Australian aid program's focus on small states and on the delivery of technical assistance has made any of these effects more pronounced. Fourthly, this chapter has adopted more advanced estimation methods which better control for endogenous explanatory variables than the 2SLS estimates seen in other previous studies. Fifthly, the core estimations have controlled for institutional persistence, which was previously unused in the only other study to consider the divergent impact of aid across small countries. Sixthly, this chapter has collected a large cross country data set across ten years with data included for small states, particularly those in the South Pacific. Finally, this chapter has adopted a more rigorous testing of the 2SLS first stage F-Statistic identification assumption, previously unused in this literature.

A number of important findings have been made. In general, it was found that the positive impact of aid on government effectiveness tends to diminish as countries decrease in population. For the full sample, the threshold estimates for when the impact of ODA on government effectiveness turns negative ranges from a popualtion of 106 thousand to 111 thousand. Whilst the specific results for Australian aid produce threshold effects between 95 thousand and 260 thousand for total Australian ODA and 302 thousand to 384 thousand for Australian technical assistance. For the full sample total ODA results this

then implies that Cook Islands, Kiribati, Nauru, Niue, Palau, and Tuvalu have all incurred negative impacts of aid on government performance whilst countries such as Tonga and FSM are on the threshold. This grouping of countries is then expanded to include Vanuatu and Samoa for the Australia specific results. As such, assuming that each of these countries has mean values for each of the other explanatory factors, out of a total of 14 Pacific Island countries included within the sample 10 can be expected to have incurred some form of negative impact of either aid, or technical assistance, between 1996 and 2006. The only countries not included in this group are Fiji, PNG, Solomon Islands and East Timor.

The results also indicate that the diminishing marginal returns to aid in population also appear to be most pronounced within the technical assistance component of aid. This is an intuitively appealing result because the range of criticisms levelled against foreign aid are often focused on its bureaucratic costs in the form of encouraging rent-seeking behaviour, undermining incentives for responsible fiscal management and its ability to soak up scarce institutional resources in the recipient country. More specifically, in terms of technical assistance, these costs have manifested themselves through accusations of the crowding out of local bureaucratic capacity and reducing domestic ownership of reform processes.

This chapter has explained the numerous reasons to believe that many of these costs may be more pronounced in small countries vis-à-vis large countries. Indeed, widespread anecdotal evidence from across the South Pacific suggests that the disproportionate power held by representatives and consultants from donor organisations in these countries has often undermined the establishment of productive working partnerships with recipient governments and bureaucracies. The weaker recipient governments in small states are also much less able to enforce donor harmonisation practices or to even enforce good donor policies, leaving aid givers much more freedom to pursue their own, rather than the recipients', objectives. The limited institutional capacity present in small states also exacerbates the costs of aid donors soaking up bureaucratic capital through design processes, monitoring and evaluation requirements, and negotiation of funding arrangements.

Given these unique challenges facing SIDS, it is perhaps no surprise to observe that the diminishing impact of aid and technical assistance in small states is particularly pronounced for Australia—given its historical focus on delivering aid to small states, increasingly in the form of technical assistance. Whilst the thresholds at which these efforts begin to have a detrimental impact vary by estimation method, these results offer an important insight into

why institutional performance has continued to deteriorate in many South Pacific countries over the last three decades. When taking the upper estimates of the population thresholds, Nauru, Kiribati, Tonga, Samoa, Vanuatu and the Solomon Islands all fall within the range where aid has a negative impact on government performance. Whilst PNG is well above these thresholds, its weak public sector capacity, low levels of human capital and fragmented politics may have made it an outlier in this regard. These results also help to explain the apparent 'Pacific paradox'—abundant external grant support parallel with poor developmental outcomes. As discussed, anecdotal evidence emerging from a number of recent AusAID reviews of its own technical assistance efforts also now appears to be reinforcing this quantitative evidence.

Governance programs are likely to remain at the forefront of Australian assistance efforts in the Pacific, particularly as the aid program scales up over the coming years. This is appropriate given the significant governance capacity constraints which are widely acknowledged as being one of the most important growth constraints to the region. However, these results should sound a substantial caution to the Australian aid program as it seeks to expand these assistance efforts.

Australia must remain mindful of the variety of distortions which foreign aid, and in particular technical assistance, can create and that these effects are likely to be much more pronounced in small states. The design of aid modalities which minimise bureaucratic burden, augment rather than replace domestic capacity, and perhaps most importantly create a requisite demand for institutional reform must therefore be at the forefront of Australia's, and other donors', efforts to continue providing high volumes of aid in the South Pacific region.

Chapter 4: Foreign Aid and Fiscal Performance in Post Independence PNG

4.1 Introduction

4.1.1 Background

The previous chapter showed that the positive impact of aid on overall levels of government effectiveness tends to decline as the size of the recipient country decreases. The following chapters delve deeper into analysing the impact of foreign aid on recipient government behaviour in SIDS through a case study of PNG. This case study focuses on how foreign aid and government behaviour have interacted to influence the process that can be broadly defined as fiscal policy. Fiscal policies, which are determined largely through the budget process, are responsible for aggregating the diverse preferences of society, assessing the redistributive consequences of meeting these preferences and ultimately providing the mechanism through which government becomes accountable to its citizens for the quality of goods and services it provides (Fischer 1993; Easterly and Rebelo 1993; Bleaney et al. 2001).

In particular, the following chapters classify the broad process of fiscal policy into three separate elements, each of which impacts on a government's ability to deliver adequate levels of social services and create an environment conducive to widespread wealth creation.

The first element of fiscal policy which is analysed is how foreign aid flows have impacted on the PNG Government's management of its fiscal aggregates such as domestic revenue collection, accumulation of public debt and expenditure levels. Effective management of these fiscal aggregates determines the sustainability of a government's expenditure and revenue policies and ultimately determines whether the government is able to support long term economic growth and macroeconomic stability by maintaining fiscal discipline. These issues are considered in Chapter 5.

The second element of fiscal policy which is analysed is how foreign aid has impacted on the allocation of PNG Government spending to productive sectors of the economy which facilitate an expansion of both human and physical capital. This includes for example the level of investment made in core public goods such as health, education, infrastructure, and law and order. These issues are considered in Chapter 6.

The third element of fiscal policy which is analysed is how foreign aid has impacted on the ability of the PNG Government to translate its public spending allocations into improved

social outcomes. In this sense, what impact has foreign aid had on the ability of the PNG Government to obtain value for money in terms of maximising the impact its spending has on the social outcomes for which the money has been designated. These issues are considered in Chapter 7.

The purpose and contribution of the present chapter therefore is threefold. Firstly, it discusses the theoretical relationships which exist between foreign aid and each of these elements of fiscal policy—and develops a theoretical model of how each of the above interactions take place. This forms the basis of the empirical models considered in Chapters 5, 6 and 7. Secondly, this chapter provides a historical analysis of the relationship between foreign aid and the PNG Government's fiscal and bureaucratic performance in the post independence era. This provides a context for the empirical analysis and reveals a number of important fiscal behaviours of successive PNG Governments. The lessons from this analysis are then included in the final policy implications chapter.

4.1.2 A Case Study of the Relationship between Aid and Fiscal Policy in PNG

PNG represents a unique and important case study for understanding the impact of Australia's foreign assistance efforts on bureaucratic and fiscal behaviour of SIDS for a number of reasons. PNG has stood as the cornerstone of the Australian aid program since its inception as a system of government-to-government grants following World War Two (ABS 2001). By the time of PNG's independence in 1975, Australia was transferring over K900 million in real 1999 terms under a program of direct budget support. This was equal to almost K500 per capita and comprised over half of the PNG Government's total revenue. Since then, PNG has received 61 per cent of total Australian aid flows. In 2007, Australia gave PNG some K650 million in real 1999 terms such that since independence Australia has accounted for just over 87 per cent of PNG's total aid receipts.

PNG also represents an important case study for the Australian aid program because despite high levels of foreign assistance, PNG's economic and social performance has languished in the post independence era (Batten 2008). Even with the exploitation of substantial mineral and natural resources, per capita incomes have continued along a long term decline (Chart 4.3). The proportion of the population living on less than US$1 a day increased from 25 to 40 per cent over the last decade, whilst health and education statistics have also continued to perform poorly, lagging behind both global averages and that of its Melanesian neighbours (Chart 4.1, Appendix 4.1). This data corroborates substantial

anecdotal evidence that the quality of government services—such as rural health posts, primary and secondary schooling, and basic infrastructure—has continued to deteriorate throughout the post independence era. These effects have been particularly pronounced in rural areas of the country where approximately 80–85 per cent of the population lives.

This situation raises a number of important questions regarding the contribution of Australian and other donor aid to PNG's overall development performance. There have been a number of previous studies seeking to answer this question. Some have argued that the rate of decline would have been much higher had the Australian aid program not been present. For example, an internal report by AusAID (2003a) titled the *Contribution of Australian Aid to PNG Development (1975–2003)* argues that the aid it has given to the education sector has been central to the isolated gains made in literacy and school enrolment rates. It also posits that aid funds have prevented the collapse of the health system and maintained funding levels for essential road and air infrastructure.[70]

In contrast, other authors have attributed the very presence of aid as the factor contributing to the decline in post independence economic and fiscal performance. These have included Windybank and Manning (2003:12) who have argued that Australian aid enabled successive PNG governments to 'live beyond their means, encouraging irresponsible policies and postponing the need for reform'. Indeed, according to Windybank and Manning (2003), Australian aid has not only perpetuated poor policies but also encouraged PNG's dependence on financial assistance as the expansive aid program became a surrogate government. This argument was also supported by Hughes (2003) and Hughes and Windybank (2005) who have argued that aid has failed in the Pacific region as a whole because it has supported irresponsible fiscal behaviour.

The DAC of the OECD also undertook a Peer Review of Australian aid in 2004. This Review gave Australia credit for evolving its aid program towards international best practice standards in its program design, administration and implementation. It also highlighted, however, the need to employ an improved framework for ensuring improved PNG Government funding for key service delivery sectors. This was because it believed wide scale fungibility had been taking place, limiting the potential impacts of aid on improving sectoral outcomes (OECD DAC 2005:94).

[70] Although, in spite of these achievements, the report still concedes that the aid program has been unable to convert this into per capita income growth.

This view was also highlighted in the *Joint Review of Australian Aid Program to PNG* (Lepani et al. 2004). This report blamed many of the poor post independence fiscal outcomes on the weaknesses in the existing performance monitoring system for jointly monitoring expenditure of total resources. This, it argued, arose largely as a result of a lack of constructive dialogue between the two governments regarding what public finances should be targeted at achieving.[71]

Each of these studies has, however, relied on casual observations of PNG's fiscal data. As shall now be shown, however, understanding the marginal impact of foreign aid on each of these macro and micro fiscal outcomes requires an analysis of the complex set of interactions which occur between these variables. Understanding these interactions can then serve as a central element of designing future assistance strategies better targeted at improving fiscal and economic outcomes in PNG.

4.2 Fiscal Effects of Aid: Theory

4.2.1 Foreign Aid and Fiscal Policy

To illustrate how foreign aid can influence each of the three elements of fiscal policy discussed above, this section considers first the most simplistic form of the PNG Government's accounting identity, which can be written as:

$$E_t - (T_t + A_t) = D_t \tag{4.1}$$

where E_t equals total government expenditure at time t, T_t equals domestic taxation receipts, A_t equals total aid revenues and D_t equals the change in the government's debt levels (borrowing) or the deficit/surplus. This is the most basic requirement which each PNG Government must satisfy each fiscal year.

Although this static framework does not reveal any inter temporal dynamics, it can be used to illustrate some important insights into the potential responses of the PNG Government following an inflow of aid. Firstly, assuming that taxation revenues are held constant, an

[71] Most recently, Heinecke et al. (2008) have argued that whilst in some cases Australian technical and financial assistance has led to observable improvements in the performance of government in PNG, insufficient attention has been placed on providing support which encourages a requisite demand for reform, and this has been limiting the overall effectiveness of the program.

inflow of aid can be used to either finance an increase in expenditures or to finance a reduction in borrowing. Similarly, holding borrowing constant, the aid inflow can finance either an increase in expenditure or a fall in domestic tax collection. Finally, in the event that the government chooses to hold expenditure levels constant, the aid inflow can be used to finance a reduction in domestic taxation or a lower level of borrowing.

Another consequence of an inflow foreign aid to a specific sector is known as the 'flypaper effect'. In this situation the aid inflow leads to a more than proportional increase in expenditure for that sector (Heller 1975; Pack and Pack 1990; McGillivray and Ahmed 1999).[72] These increasing expenditures must then be funded either via increased domestic revenue collection or through higher levels of borrowing—such that the inflow of aid leads to higher levels of public debt.

One explanation for this effect is the ability of foreign aid to mobilise additional resources for government expenditures through, for example, improving tax collection or opening up new private sector sources of credit (World Bank 1998:64). McGillivray and Morrissey (2000) also offer an alternative explanation through a concept they call 'aid illusion'. The authors argue that with imperfect information flows and weak expenditure management systems, aid inflows may be accompanied with misperceptions or illusions regarding either the real or nominal value of the aid inflow, and the spending conditions attached (McGillivray and Morrissey 2000:3). For example, donors may deny funds due to the recipient's failure to meet certain conditionality agreements, following which the government may have to resort to additional borrowing to cover the expected revenue flow. Likewise, imperfect budgetary processes may overvalue the contribution of aid to a specific project or the aid inflow may require counterpart funding, both of which can also create a need for government to find additional funds. Equally, the government may also find that it has a lower need to borrow funds in the event that its public service under values the contribution of donor funds within a particular fiscal cycle.

Whether this, or any of the other fiscal effects of aid described, occurs depends ultimately on how the recipient government responds to the inflow of aid. From a theoretical perspective however, none of these outcomes are necessarily preferable to others. In a country with high and/or distortionary taxes, a cut in domestic revenue may stimulate

[72] The flypaper effect was originally coined in reference to the effect of grants from upper level government stimulating higher levels of local spending than would a comparable increase in local income (van de Walle and Mu 2007:669). In this sense aid tends to 'stick' to these expenditures (see Heller (1975), McGillivray and Ahmed (1999) and Pack and Pack (1990) for a discussion in the aid context).

further private sector investment whilst in a low taxation environment this action may encourage higher levels of aid dependence. Likewise, additional expenditure may be used to finance growth-inducing productive activities or it may perpetuate the existence of subsidies which distort the prevailing business environment.

To try and ensure that funds are spent on donor priorities, foreign aid is often disbursed to specific expenditure priorities or activities within the recipient country. These allocations reflect the donors' own preferences for the optimal allocation of their financial assistance. Hence, Equation (4.1) can now be more accurately written as:

$$E_{D,t} + E_{G,t} - (T_t + BS_t + PR_t) = D_t \tag{4.2}$$

In this case, the donor attempts to satisfy their own expenditure preferences by delivering aid in the form of either general budgetary support, BS_t, or as aid earmarked for expenditure on particular activities or sectors of the economy typically through project or program delivery mechanisms, PR_t. Assuming that the donor has altruistic motivations, PR_t allocations are made to sectors which they perceive to be development orientated, $E_{D,t}$, whilst BS_t can be spent freely by the recipient on either development expenditures, $E_{D,t}$, or other general government expenditures, $E_{G,t}$.

4.2.2 Aid and Fiscal Aggregates

How the recipient government decides to treat these two different types of aid inflows will depend on two key factors. First is the recipient government's own utility function whereby it derives benefit from allocating government funds across each of the two expenditure priorities, $E_{D,t}$ and $E_{G,t}$. Assuming that these preferences can be expressed with the familiar Cobb-Douglas utility function, this can thus be written as:

$$U(E_{D,t}, E_{G,t}) = E_{D,t}^{\alpha}.E_{G,t}^{1-\alpha} \tag{4.3}$$

The second determinant is the proportion of aid allocated in the form of PR_t which the recipient government treats as fungible, ϕ. This ϕ parameter represents the amount of aid which the recipient government perceives it can use to free up its own revenues to spend on other priorities, such as lowering taxation, lowering borrowing or altering the

expenditure composition between $E_{D,t}$ and $E_{G,t}$. Incorporating this into Equation (4.2) thus gives:

$$P_{D,t}.E_{D,t} + P_{G,t}.E_{G,t} - (T_t + BS_t + \phi PR_t) = D_t \tag{4.4}$$

This identity represents the recipient government's budget constraint when it goes about solving Equation (4.3). As such, the government maximisation problem can be written as:

$$\max_{(E_D,E_G)\in\Gamma(G)} U(E_{D,t},E_{G,t}) \quad s.t. \quad (T_t + BS_t + \phi PR_t) + D_t - P_{Dt}.E_{D,t} + P_{G,t}.E_{G,t} = 0 \tag{4.5}$$

The Lagrangian for the problem can thus be written as:

$$\ell = E_{D,t}^{\alpha}.E_{G,t}^{1-\alpha} + \lambda(T_t + BS_t + \phi PR_t + D_t - P_{D,t}.E_{D,t} + P_{G,t}.E_{G,t}) \tag{4.6}$$

This gives the first order conditions:

$$\frac{\partial \ell}{\partial E_{D,t}} = \alpha E_{D,t}^{\alpha-1}.E_{G,t}^{1-\alpha} - \lambda P_{D,t} = 0 \tag{4.7}$$

$$\frac{\partial \ell}{\partial E_{G,t}} = (1-\alpha)E_{D,t}^{\alpha}.E_{G,t}^{-\alpha} - \lambda P_{G,t} = 0 \tag{4.8}$$

$$\frac{\partial \ell}{\partial \lambda} = T_t + BS_t + \phi PR_t + D_t - P_{D,t}.E_{D,t} + P_{G,t}.E_{G,t} = 0 \tag{4.9}$$

which for each of the two expenditure categories solves to give:

$$\begin{aligned} E_{D,t} &= \alpha(T_t + BS_t + \phi PR_t + D_t) \\ E_{G,t} &= (1-\alpha)(T_t + BS_t + \phi PR_t + D_t) \end{aligned} \tag{4.10}$$

These expenditure identities can then be rearranged to give a system of interdependent equations which relate the impact of foreign aid on each of the fiscal variables according to:

$$
\begin{aligned}
E_D &= \omega(T, BS, PR, D) \\
E_G &= \tau(T, BS, PR, D) \\
T &= \eta(E_D, E_G, BS, PR, D) \\
D &= \kappa(E_D, E_G, T, BS, PR) \\
A &= \pi(E_D, E_G, T, D)
\end{aligned}
\tag{4.11}
$$

This system of fiscal equations provides the theoretical basis for analysing the impact of foreign aid on the PNG Government's management of fiscal aggregates in the post independence period in Chapter 5. Chapter 6 then disaggregates the expenditure components of this system to consider a model which analyses the impact of foreign aid on the composition of government expenditure, decomposing spending between a number of sectoral priorities.

4.2.3 Aid and Public Sector Efficiency

Just as important as where the government allocates its resources is how effective the public sector is at utilising these resources to achieve improvements in service delivery within each sector. This is a particularly pertinent issue both within PNG and the other SIDS of the South Pacific as weak public sector capacity continues to be a significant contributor to poor levels of service delivery (Feeny and Rogers 2008).[73] Along with providing resources for pro poor investments therefore, a key question for the Australian aid program is what role its own, and other donor, assistance plays in improving the ability of recipient governments to use both domestic and foreign resources effectively.

Assume, for example, that the public expenditure allocation $E_{Di,t}$ derived above is targeted at the attainment of a specific development outcome i at time t, $\Phi_{i,t}$. Incorporating this spending into a social welfare production function of the type used in Rajkumar and Swaroop (2002) can be written as:

$$
\Phi_{i,t} = e^{\Lambda_t} \cdot \left(\frac{Y_t}{N_t}\right)^{\alpha} \cdot \left(\frac{E_{Di,t}}{Y_t}\right)^{\beta} \qquad \alpha > 0, \beta \geq 0 \tag{4.12}
$$

[73] Feeny and Rogers (2008), for example, find that public sector efficiency at improving health and education outcomes tends to be considerably lower in SIDS than in other larger countries.

where Λ_t is a vector of time, *t*, variant factors that affect the performance of the recipient government in providing public services, Y_t is total output and N_t is total population. The restrictions placed on the marginal elasticity coefficients for both per capita GDP, α, and public expenditures as a percentage of GDP, β, indicate that outcomes in sector i are strictly increasing with improvements in per capita income and that outcomes in sector i are weakly increasing with higher levels of public expenditure.

In environments of weak public sector accountability and poor expenditure management processes such as in PNG, the amount of funds allocated to a specific expenditure priority may, however, not actually be representative of the ability of those funds to influence social welfare outcomes. In this case it can be said that in Equation (4.12):

$$\beta = \upsilon(.) \cdot \beta_i \tag{4.13}$$

where the function $\upsilon(.)$ represents the amount of i sector development expenditures, $E_{Di,t}$, which are spent productively rather than wasted through misuse, corruption or malfeasance. In essence this is a measure of the efficiency of the public sector in transforming budgeted expenditure allocations into productive investments. The β_i term thus represents the efficiency of the public service in converting these government allocated funds into social outcomes in each sector.

As discussed, however, technical assistance can potentially have an important impact on the efficiency of public spending, both by providing additional bureaucratic resources (the 'doing' component of technical assistance) and by improving the quality of existing resources through capacity development (the 'building' component of technical assistance).[74] Given this, $\upsilon(.)$ can be said to be represented by:

$$\upsilon_t = \chi_{o,t} + \chi_{1,t} \cdot \mathrm{T}_t \tag{4.14}$$

where T_t is the amount of technical assistance received at time t and $\chi_{1,t}$ is the marginal impact of technical assistance on public sector efficiency. Substituting 4.14 into 4.13 gives $\beta = \left(\chi_{0,t} + \chi_{1,t} \cdot \mathrm{T}_t\right) \cdot \beta_i$ which can then be substituted into 4.12 to give:

[74] This approach contrasts with that of Rajkumar and Swaroop (2002) who focused on the role of governance in determining public sector efficiency.

$$\Phi_{i,t} = e^{\Lambda_t} \cdot \left(\frac{Y_t}{N_t}\right)^{\alpha} \cdot \left(\frac{E_{Di,t}}{Y_t}\right)^{(\chi_{0,t}+\chi_{1,t}\cdot T_t)\cdot\beta_i} \tag{4.15}$$

Suppose also that each of the explanatory variables is interdependent. For example, technical assistance is designed to effect the efficiency of public service delivery which, combined with public expenditures, will flow on to effect income growth. In turn, income growth will affect social welfare outcomes, and public sector capacity is likely to be a determinant of the amount of aid received as technical assistance. The relationships shown in Equation (4.15) can then be more fully categorised by a system of equations given by:

$$\begin{aligned} \Phi &= f(\Lambda, Y/N, E_{Di}/Y) \\ \Lambda &= g(\Phi, Y/N, E_{Di}/Y) \\ Y/N &= h(\Phi, \Lambda, E_{Di}/Y) \\ E_{Di}/Y &= k(\Phi, \Lambda, Y/N) \end{aligned} \tag{4.16}$$

This specification is applied in Chapter 7 to a case study of PNG's health sector as a means of assessing how technical assistance has affected the efficiency of the public sector in providing health outcomes. The remainder of this chapter provides a historical background for this case study, discussing the inter play between foreign aid, in its varying forms, and PNG's fiscal policy since independence.

4.3 Post Independence Foreign Aid and Fiscal Trends in PNG

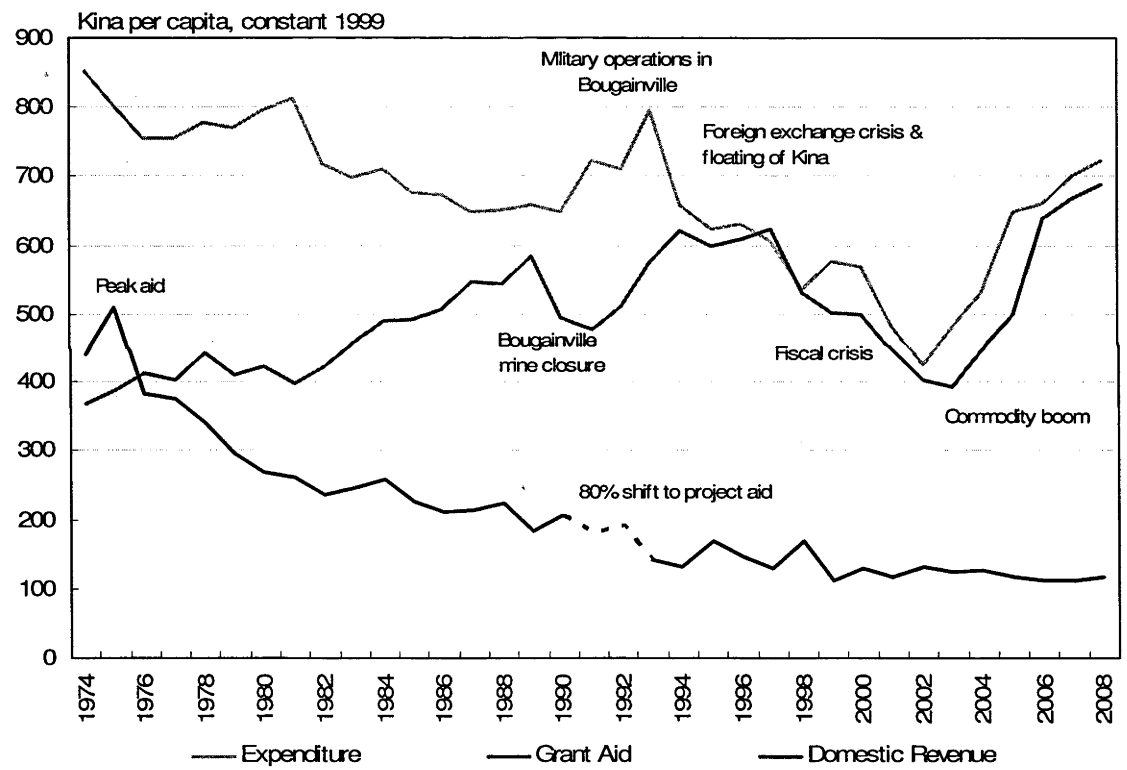
4.3.1 The Budget Support Era (1975–87)

PNG began the post independence era with a small, mostly agriculturally based economy with domestic revenues sourced from personal income taxes of the large expatriate population, a few larger companies and trade duties (Fallon 1992:10). During 1975–87, PNG was also heavily dependent on the receipt of financial assistance from foreign donors, mostly originating from its former colonial administrator Australia in the form of budgetary support. The budget support approach emphasised the role of aid in alleviating the resource constraints facing the government as it had a limited domestic production base and poor revenue raising ability. Channelling resources directly into PNG's budgetary system also had the added advantage of utilising and potentially strengthening the government's fiscal management processes, giving the newly independent government a high degree of control and ownership over of these resources. The importance of budget support to PNG's fiscal position during this period can be seen in Chart 4.1, which shows

that in 1975 foreign financial support was equivalent to just over K900 million in real 1999 terms. This funding was approximately 20 per cent larger in per capita terms than total domestic revenue collection.

In the years following independence, PNG began to reduce its reliance on foreign aid as a source of government revenue. After peaking in 1975, real levels of foreign aid per capita declined at an average rate of 8 per cent per annum between 1975 and 1982. This decline occurred in tandem with a growth in domestic revenue collection from K365 per capita in 1975 to K450 per capita in 1982. Nevertheless, foreign assistance was still a dominant source of finance for government expenditure during this period, with grants averaging 38 per cent of total revenue.

Chart 4.1: Government Expenditure*, Domestic Revenue and Total Aid Flows



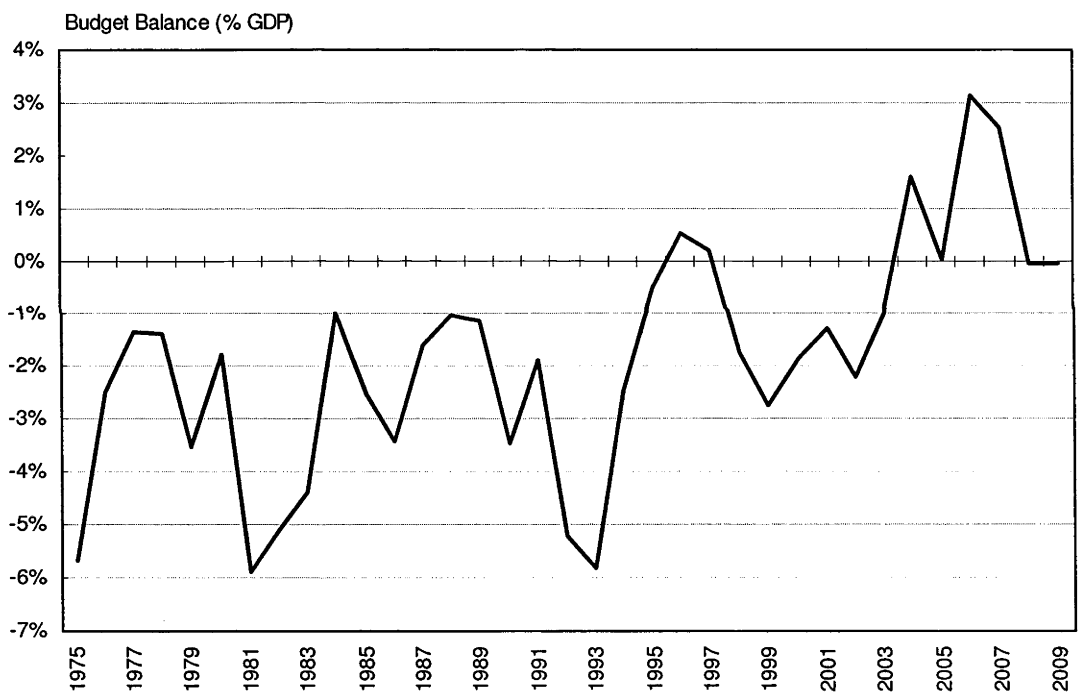
Source: Government PNG Budget Documents (various years), see Appendix 5.1. * Excluding debt repayment.

Despite growing domestic revenues, the rapid decline in foreign financial support meant that the PNG Government faced immediate difficulties in trying to maintain fiscal balance (Hinchliffe 1980:820). Adding to these pressures was also the rapid growth in the cost of the bureaucracy, which occurred from increasing minimum wage levels (to compensate for the high rates of inflation induced by the 1973 oil price shock) and a continuing decentralisation of government service delivery—following the establishment of provincial

governments in 1977. BPNG (1978), for example, estimates that in 1978 up to 58 per cent of government expenditure went on salary and wages costs.

A growing bureaucracy combined with pressures for an improvement in service delivery from a newly formed government and declines in budget support led to a large and persistent fiscal gap in the late 1970s (Lim 1987). During this period, total expenditures equalled just over 30 per cent of GDP, whilst domestic revenue equalled 10 per cent of GDP leaving a 20 per cent fiscal gap. Foreign grants covered the majority of this gap, averaging 15 per cent of GDP, and underwrote the costs of the growing bureaucracy. However, with expenditures exceeding revenues by an average of 4–5 per cent of GDP, the budget remained in deficit for the rest of the decade which led to steadily increasing public debt (Chart 4.2).

Chart 4.2: Budget Balance (1975–2009)

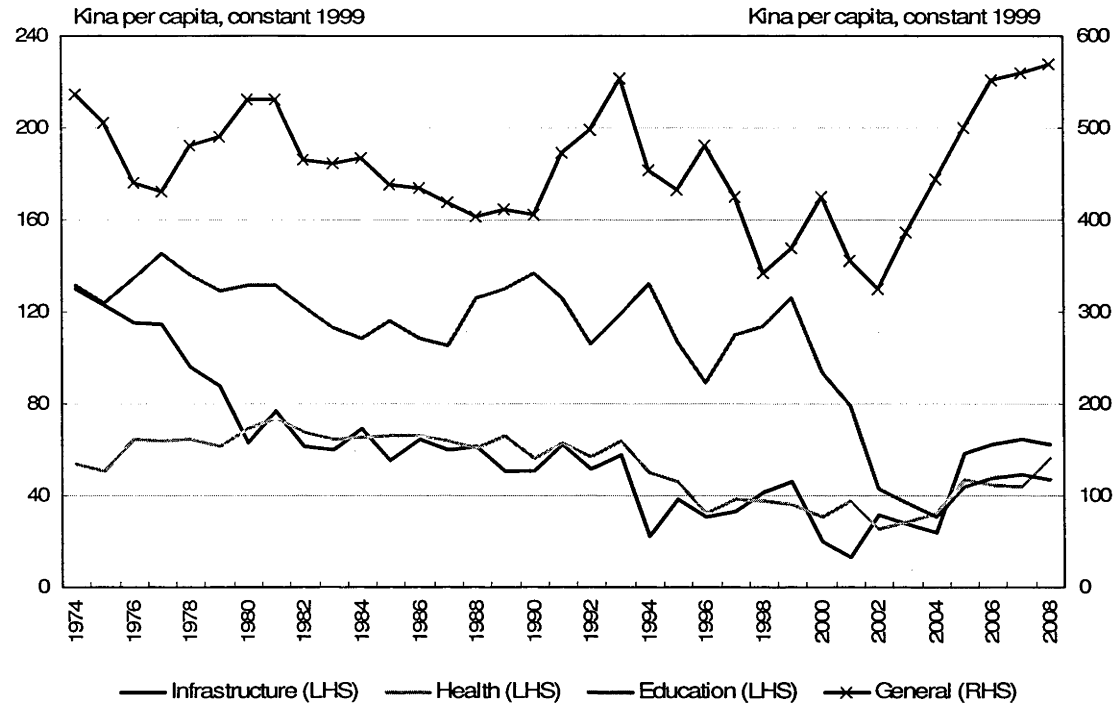


Source: IMF GFS (2009) and GoPNG (2008, 2009).

These fiscal pressures also led to some significant changes in the composition of government expenditures. In particular, whilst health and education spending remained relatively constant throughout this period, the rapid increase in general government expenditure corresponded with a significant drop in infrastructure investment—which fell from a peak of K130 per capita in 1974 to K60 per capita in 1982 (Chart 4.3).[75]

[75] Sectoral expenditure figures represent a substantial data collection exercise undertaken with data from the IMF International Finance Statistics (2008) and the PNG Department of Treasury and Finance (explained in detail in Appendix 5.1). These figures are expressed

Chart 4.3: Government Expenditure by Sector—Infrastructure, Health, Education and General

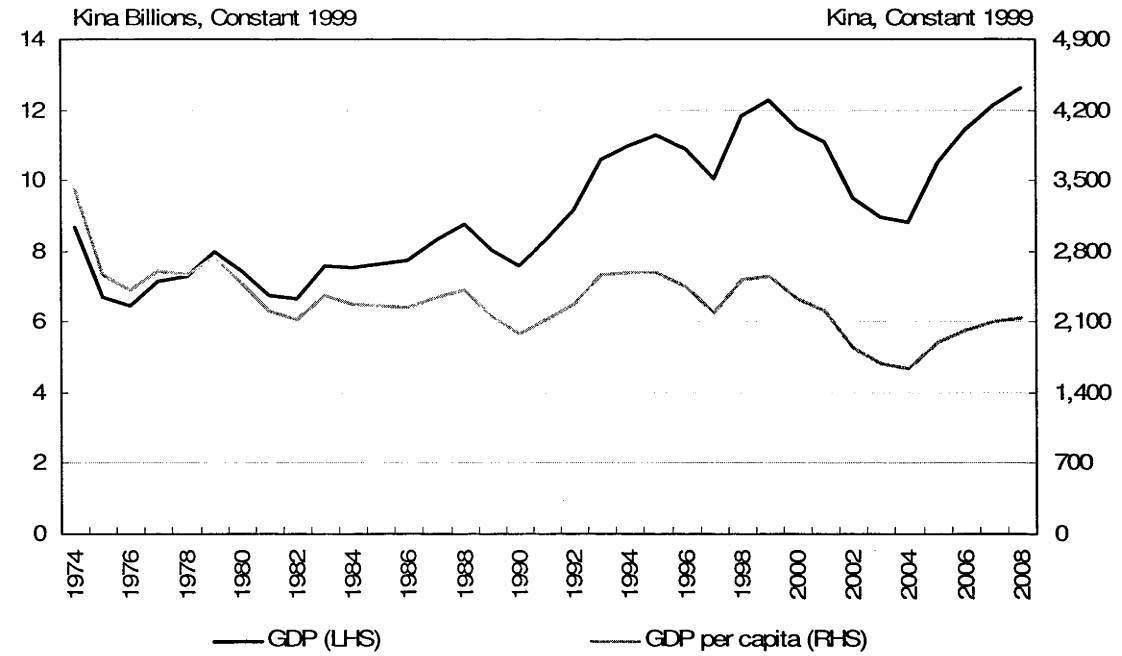


Source: Government PNG Budget Documents (various years), see Appendix 5.1.

PNG entered the 1980s facing a number of severe external shocks to its economy. The tripling of oil prices following the global oil price shock in 1979 led to a rapid decline in the economy's terms of trade and a subsequent deterioration of its balance of payments position. The emergence of a global recession in 1980 then caused a considerable drop in the prices of many of PNG's key agricultural export commodities. The revenue impact of this was also augmented by a period of reduced output from the Bougainville mining operations which had been making a large contribution to government revenues since 1974 (Wolfers 1981). This effect can be seen in Chart 4.4 which shows real GDP per capita declining below its 1975 level in the early 1980s.

in per capita terms to reflect the government's financial ability to deliver a comparable set of services to the entire population in the post independence period. Government expenditures include those components of foreign aid which are channelled through PNG budgetary processes.

Chart 4.4: GDP and GDP Per Capita (1974–2008)



Source: Government PNG Budget Documents (various years), see Appendix 5.1.

These pressures posed the government with some significant fiscal challenges. GDP growth was again negative in 1980, recording a decline of 2.3 per cent, and inflation levels had jumped to 12 per cent. Reduced Australian budgetary support also led to grant revenue declining to approximately 31 per cent of total revenue. Combined with almost static domestic revenue collection between 1980 and 1982, this led to a tight fiscal constraint on any attempts by the government to fund new expenditures.

Some non priority expenditure cuts were made during this period, mainly in areas related to capital projects and ongoing maintenance costs, with their share of total expenditure dropping from 15 to 12 per cent between 1980 and 1982 (BPNG 2007). In contrast, other recurrent costs such as wages and salaries continued to grow. This meant that despite stagnant funding levels to development priority areas such as health and education, the fiscal gap increased dramatically in 1981 and 1982, with the budget recording deficits of 5.9 and 5.1 per cent of GDP, respectively.[76]

In 1982, the PNG Government commissioned the Garnaut and Baxter Review (1983) which sought to assess the country's macroeconomic policy settings, focusing in particular on the country's fixed exchange rate system. Motivated in part by the upcoming floating of

[76] Public employment numbers continued to increase during this period reaching upwards of 50,000 in 1982 and soaking up approximately 33 per cent of total budget expenditures (King 1983:165).

the Australian Dollar in 1983, the Review supported the continuation of a pegged exchange rate, or hard Kina, policy for PNG (Garnaut and Baxter 1983). However, the Review also emphasised that to maintain a pegged exchange rate, the government would have to reduce its overall expenditure levels and increase fiscal discipline in order to correct the macroeconomic imbalances which had opened up during the early 1980s. Central to this task would be efforts to reduce the price of labour (which had been growing strongly with increases in minimum wages) relative to other tradable goods by approximately 25 to 30 per cent so as to offset the contractionary effects on employment which would occur from a reduction in the level of government expenditure.

The PNG Government chose not to implement any wage growth constraints (Imbun 2005:231). Instead it chose to re-orientate its macroeconomic and fiscal policy towards a more sustainable footing by trying to improve fiscal discipline and devaluing the Kina to encourage greater international competitiveness.[77] This included a fiscal stabilisation policy which targeted a restraint on expenditure growth leading to an overall cut in expenditures of just over 5 per cent in real terms for the 1983 budget (Hegarty and King 1983:224). This allowed the government to reign in the large fiscal gap which had opened up in the immediate post independence period, however, the budget continued to remain in deficit, averaging 0.2 per cent of GDP between 1983 and 1987.

4.3.2 The Bougainville Crisis and the First Donor Bail-Out (1988–93)

By the end of 1988, the economy and its fiscal management began to deteriorate (Fallon 1992:10). A drop in agricultural prices led to lower government revenues and foreign financial assistance continued to decline, falling from 34 per cent of total revenues in 1983 to just under 20 per cent in 1989.[78] The economy also contracted by 1.4 per cent in 1989 and by just under 3 per cent in 1990—which contributed to the budget deficit increasing from 1.15 per cent of GDP in 1989 to 3.5 per cent of GDP in 1990.

This deteriorating economic performance also gave rise to a growth in the criticism of Australia's program of direct budget support. Primarily, critics began to argue that budget support had insulated successive PNG Governments from taking difficult decisions on revenue raising efforts or for prioritising their own domestic resources towards key

[77] In terms of the US Dollar, this led to a drop in the exchange rate from K 1.36/US$ in 1982, to parity in 1985.

[78] This decline occurred in line with the 1985 Aid Agreement between Australia and PNG which agreed on a gradual reduction of 3 per cent per annum in real terms in the total amount of Australian funding.

development sectors (Callick et al. 1990:81). Large inflows of unconditional Australian aid were also attributed to PNG's booming government sector which since independence had been growing at a faster rate than the economy.[79] In turn, this drew a large proportion of the limited supply of educated and entrepreneurial citizens into the bureaucracy rather than towards more productive sectors of the economy conducive to wealth creation.[80]

Growing expectations regarding PNG's ability to obtain fiscal self reliance from the expanding mining sector during the 1980s, combined with perceptions of fiscal mismanagement (May 2001; Standish 2007:135) then led Australia to initiate a shift in its aid delivery away from direct budgetary support. This approach was formalised with the signing of a new Development Cooperation Treaty (DCT) between the two governments in 1989 which sought to gradually increase the proportion of funds given to earmarked activities through project aid.[81]

It was also during the late 1980s when the PNG Government was plunged into its first major crisis in the form of a domestic conflict in its Bougainville province. A struggle for greater compensation and less environmental damage by local residents from the Panguna Copper Mine run by Bougainville Copper Limited (BCL) manifested itself into an island wide struggle for independence. In 1989, the Bougainville Revolutionary Army (BRA) closed the mine by launching a secessionist war (Masono 2006:35).[82] By the time of its closure, the Panguna mine, half way through a 30-year lifespan, was generating approximately 35 per cent of the country's total exports, 15 per cent of government revenue and 8 per cent of GDP (Stein 1991:7). As a result, the abrupt cessation of activities in this mine had a large destabilising effect on the economy. The effects of this on the fiscal position were also compounded by a large drop in cocoa production on the island from the associated conflict as well as a large drop in the country's terms of trade for a number of other agricultural products such as coffee, copra and palm oil (Batten 2008). In total,

[79] The World Bank (1999:129), for example, estimates that despite numerous attempts at downsizing the public service, by 1990 total wage spending comprised 40.1 per cent of recurrent government expenditure and 33.9 per cent of total expenditure.

[80] More recently, Hughes (2003) and Hughes and Windybank (2005) have also supported this view, arguing that budgetary support was widely used to fund higher levels of general government consumption and had underwritten the government's inability to prioritise resources away from inefficient or ineffective government activities.

[81] Specifically, this Treaty committed Australia to providing K750 million of assistance over the following five years. Whilst this maintained nominal levels of budgetary assistance (in effect declining by the rate of Australian inflation), all further increases in financial assistance were agreed to occur through project aid (DCT 1989).

[82] It was not until 1997 that a degree of peace was officially restored following the government's controversial hiring of the Sandline mercenary group to remove the leadership of the BRA and secure control over the mine (May 2006:160). Later in 1997, peace talks commenced, brokered by Australia and New Zealand, which eventually led to the establishment of the Autonomous Bougainville Government (Regan 1998).

domestic revenue collection declined by 15 per cent in per capita terms between 1989 and 1990, and then by a further 4 per cent between 1990 and 1991 (Chart 4.1).

Increasing military obligations arising from the Bougainville conflict also placed pressures on the expenditure side of the government's fiscal envelope. Following a small 1.5 per cent contraction between 1989 and 1990 amid the drop in revenue, expenditures increased by 12 per cent between 1990 and 1991. When combined with the loss in revenue, this led both to a sharp deterioration in the fiscal balance, with the budget deficit increasing from 1.15 per cent of GDP in 1989 to 3.5 per cent of GDP in 1990. The government's total outstanding debt also rapidly increased, rising in real terms by 14 per cent between 1989 and 1990, from K3.2 billion to K3.7 billion.[83]

Further compounding these fiscal pressures was an escalation by Australia of the rate at which it sought to shift the aid program from direct budgetary support to project aid. This stemmed largely from the continuation of the Bougainville crisis, and the Australian Government's desire not to be seen as funding conflict related expenditures through its aid program (Tulip 2005:1).[84] As shown in Chart 4.5, in the four years following the signing of the original 1989 DCT, the amount of budgetary support dropped rapidly, declining from K140 per capita to K24 per capita, a decline of 82 per cent. When combined with the 18 per cent decline in per capita domestic revenue generation which occurred throughout this period (falling from K600 per capita to K490 per capita), it meant that at the peak of the Bougainville crisis the PNG Government was increasingly left to finance non donor-financed sectors with its own resources.

This initiated a number of fiscal responses by the PNG Government. In the first instance was a dramatic increase in levels of borrowing to maintain expenditures in other non donor-financed areas of the budget, particularly those related to defence. As such, despite falling domestic and budgetary support revenues, there was a large increase in aggregate expenditure levels during this period (Chart 4.5).

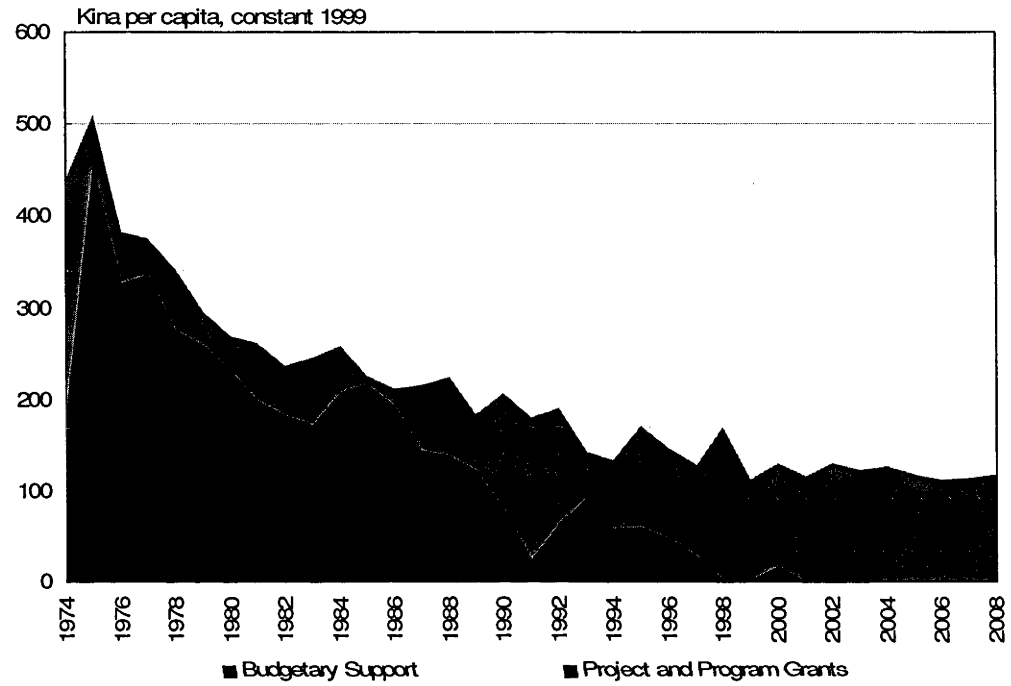
Another important feature of this rapid shift away from budget support was that despite aid being increasingly tied to specific development activities, the amount of aggregate funding for development items such as health and infrastructure remained relatively

[83] These developments did, however, have little impact on revenue collection as they were only in the early stages of production.

[84] This policy was formalised in a revised DCT signed by the two governments in 1992, which, whilst offering comparable levels of financial support, committed Australia to a complete phasing-out of budget support by the end of the decade in favour of project aid.

unchanged between 1989 and 1991, whilst per capita funding for education actually fell. In contrast, funding for the general expenditure category increased rapidly. As shall be analysed in Chapter 6, this illustrates a period of extreme aid fungibility where the PNG Government was forced to withdraw resources from aid-financed sectors in order to fund activities related to the Bougainville crisis.

Chart 4.5: Budgetary Support and Project and Program Grants (1974–2008)



Source: Government PNG Budget Documents (various years), see Appendix 5.1.

The government's growing levels of deficit financing throughout the crisis also continued to stimulate domestic demand. This contributed to higher levels of import growth, raising the country's already high current account deficit. Under a fixed exchange rate regime, the loss of foreign exchange earnings from the Bougainville mining operations, combined with public sector debt reaching 47 per cent of GDP in 1990, meant that the government was facing a considerable shortage of foreign exchange reserves at the end of the decade.

Donors responded to this situation in 1990 by issuing a US$50 million World Bank loan through the International Bank for Reconstruction and Development to cover the government's foreign exchange requirements (World Bank 1990). As part of the conditionality associated with this package, PNG was required to adopt its first Structural Adjustment Program (SAP). Under the requirements of the SAP, the government adopted a stabilisation package which devalued the Kina by 10 per cent and committed to restrain wage growth, reduce recurrent expenditures and undertake a number of structural reforms

aimed at trade liberalisation and the privatisation of state owned entities (World Bank 1990). These moves, combined with the commencement of production at the Misima mine and the further development of the Porgera mine, were enough to keep the economy out of sustained recession, with GDP growth rebounding strongly in 1991 following two years of successive contraction in 1989 and 1990.

Following the 1990 SAP agreement, the economic fundamentals of the economy showed signs of improvement. The economy expanded by 9.5 per cent in 1991, 13.8 per cent in 1992 and by 18.2 per cent in 1993. This economic recovery was largely a result of increased resource extraction from new mines that opened in the 1980s, such as Ok Tedi and the Misima mine (BPNG 1998). The revenue effect of this was then enhanced by a substantial increase in resource prices, creating PNG's first major commodity boom. Domestic revenue increased dramatically, growing by almost 40 per cent between 1991 and 1995. These rapid revenue increases also more than compensated for the further decline in foreign budgetary support which in real per capita terms had decreased by 70 per cent between independence and 1995.

In 1993, continued slow progress on development outcomes and rapidly expanding revenue streams from resource extraction led the government to adopt a premeditated rebuttal of the attempts at fiscal restraint committed to in the 1990 SAP (BPNG 2007).[85] On the revenue side, the government also sought to stimulate the supply side growth of the economy by lowering personal income and company tax rates (BPNG 1998). This aggressive fiscal approach led to a planned budget deficit of 3.3 per cent of GDP in 1993. But despite revenue growth of just over 18 per cent between 1992 and 1993, continued expenditure overruns by numerous government departments meant the government still failed to remain within its target, recording a final deficit outcome equal to 5.5 per cent of GDP.

4.3.3 Currency Crisis and the Second Donor Bail-Out (1994–97)

Given PNG's reliance on imports for consumption and investment goods, the stimulatory impact of the government's unrestrained expenditure again led to a significant increase in

[85] As quoted in the 1993 budget by the Wingti Government which came to office in July 1992: 'The 1993 budget heralds in something of a new era in fiscal policy in that the revenue and balance of payments constraints have to some extent been relaxed, at least in the short term. The relaxation occurs as a result of receipt from 1993 of very rapidly improving revenues from mining and especially petroleum. Recognition of the new situation has led the government to believe that a somewhat more aggressive fiscal policy is now appropriate' (BPNG 2007).

the demand for foreign exchange during the early 1990s. By the end of 1993, foreign exchange reserves were enough to cover only 1.6 months of total imports (BPNG 2007). Following a considerable drop in global oil prices as well as declining output levels in mining and agriculture, there was a revenue shortfall in 1994—in contrast to the 1993 overshoot (Mawuli 1997:14). This forced the government to seek out unprecedented levels of domestic borrowing to maintain funding for its planned development expenditures. By the middle of the year, the deficit had already exceeded its yearly target, reaching K277 million (Mawuli 1997:12), and public debt continued to increase rapidly (King and Sugden 1996:17).

The combination of rapidly accumulating debt and dwindling foreign exchange supplies led to another balance of payments crisis towards the end of 1994, as investors withdrew resources and the government struggled to find new creditors.[86] The loss of foreign exchange reserves also forced the Bank of Papua New Guinea to move from a fixed peg to a floating exchange rate regime in October 1994 as it could no longer intervene to defend the value of the Kina (Bowman 2005:5).

Following the election of a new government in September 1994[87] and its stated commitment to restoring fiscal discipline, Australia offered loan facilities to the PNG Government if it agreed to another set of SAP conditions set by the World Bank. This caused a degree of political strain between Australia and PNG.[88] However, upon PNG's agreement, the IMF offered US$111 million in loan facilities to help the government restore macroeconomic stability (IMF 1995:2). The SAP conditions imposed by the World Bank targeted a number of reforms again focusing on restructuring the public sector, imposing greater constraints on expenditure levels and promoting faster rates of trade liberalisation and tax reform.

The government made some initial attempts at implementing the conditions of the SAP by reining in expenditure and undertaking some modest reforms in import liberalisation and revenue collection (IMF 1998). However, following another short period of fiscal austerity in 1995 and 1996, the reform process halted as a combination of both internal and external

[86] Treasury T-Bill Rates, for example, reached up to 21 per cent in order to attract more capital to fund public debt (Mawuli 1997:12).

[87] This coalition government was led by Sir Julius Chan.

[88] Woolner (1995:21) explains, for example, that Sir Julius Chan had initially been seeking soft loan options from donors and that the government only agreed to the SAP conditions following Australia's refusal to provide unconditional funds. Many domestic PNG leaders then saw themselves as bearing a perceived loss of face with intervention from the World Bank, and blamed Australia for not supporting them better.

factors again shook the economy in 1997. This included cyclones, an on-going drought which had a severe effect on agricultural production as well the closure of the Ok Tedi and Porgera mines due to inadequate water supplies. These natural shocks were also compounded by the Asian financial crisis and the high cost and political instability originating from the Sandline intervention in Bougainville which seriously disrupted business, consumer confidence and macroeconomic stability (Curtin 2001). As a result, real GDP contracted by 6.3 per cent in 1997.

This period of fiscal management also marked a considerable shift in the composition of government expenditure away from some key development items. Between the onset of the Bougainville conflict in 1989 and the 1994 foreign exchange crises, education funding dropped from K135 per capita in 1990 to K100 per capita in 1992. This was accompanied with a further halving of investment in infrastructure from K55 per capita in 1993 to just over K20 per capita in 1994. Cutbacks were also made in health, albeit at a more gradual rate from K60 per capita in 1993 to K35 per capita in 1996. In contrast, other general government expenditure increased rapidly from K400 per capita in 1990 to K550 per capita in 1993, which again reflected in part the growing need to fund the government's military operations in Bougainville.

4.3.4 Public Debt Crisis and Changing Aid Modalities (1998–2002)

Following elections in June 1997, a new government led by Prime Minister Skate again made commitments to establish more responsible fiscal management. However, uncontrolled spending by a number of ministries (in particular again related to the Defence department) combined with declining government revenue from the effects of drought, and the flow-on effects from the 1997 Asian financial crisis led to continued deficit financing of the budget (Standish 2001:285). Fiscal discipline continued to slip over the next two years, and, as outlined in Duncan (2002:4), by 1999 'government expenditure was again out of control, the budget deficit was expected to increase sharply, international reserves had fallen sharply and the Kina had depreciated rapidly, and inflation and interest rates had also increased rapidly'. In effect this again brought the country to the brink of bankruptcy.

In August 1999 another government came to power under the leadership of Sir Mekere Morauta. This government also widely committed itself to a more conservative and restrained approach to fiscal policy, immediately adopting a range of measures to improve the transparency of expenditures and responsible payment and acquisition of debt

(Standish 2001:286). The first step of the new government was to hand down a supplementary budget which tried to account for the full amount of government liabilities accrued over the previous years. The situation emerged as being critical. Unpaid departmental spending (mainly defence, but also in health and many others) had accumulated to approximately 16 per cent of the recurrent budget, or 10 per cent of the total budget (BPNG 2007).

The government thus set out to undertake a significant reorganisation of fiscal policy, increasing personal and corporate tax rates as well as replacing the pre-existing sales tax with an across-the-board value-added tax (VAT) in 1999 to broaden the revenue base—which had become increasingly reliant on commodity and resource revenues throughout the 1990s (BPNG 1999; BPNG 2000). These reforms reassured reluctant international donors of the government's commitment to more responsible fiscal and economic management and resulted in further loans. In mid 2000, the PNG Government received its third SAP loan from the World Bank and the IMF (IMF 2000).[89]

Continued fiscal pressure was, however, placed on the government from declining levels of real GDP by almost 2.5 per cent in 2000 following only modest growth of 1.8 per cent in 1999. This occurred in spite of relatively strong growth in the agricultural, fisheries and forestry sectors as it was counteracted by a drop in the mineral sector from declining crude oil and copper production (GoPNG 2001). The government also faced high inflation rates of 14.9 per cent in 1999 and 15.6 per cent in 2000. Ultimately, despite a focus placed on the need for balanced budgets in order to curtail central government debt, the 1999 and 2000 final budget outcomes continued to record deficits of 2.7 and 1.9 per cent of GDP, respectively.

The 1999–2000 public debt crises also had a number of important impacts on funding levels for key service delivery sectors. In 1999, the then Prime Minister Skate turned to a foreign advisor, Dr Pirouz Hamidian-Rad, and his consultancy firm Ikub to put together the 1999 budget (Standish 1999). In an attempt to reduce the size of the deficit, the 1999 budget adopted extensive cuts to many government departments,[90] abolishing 15 statutory

[89] Whilst the IMF loan stipulated strict controls around fiscal and external account management, the terms of the World Bank's Structural Adjustment Program required the government to significantly cut public expenditure on wages and salaries and redirect its expenditure towards priority human development areas (IMF 2000).

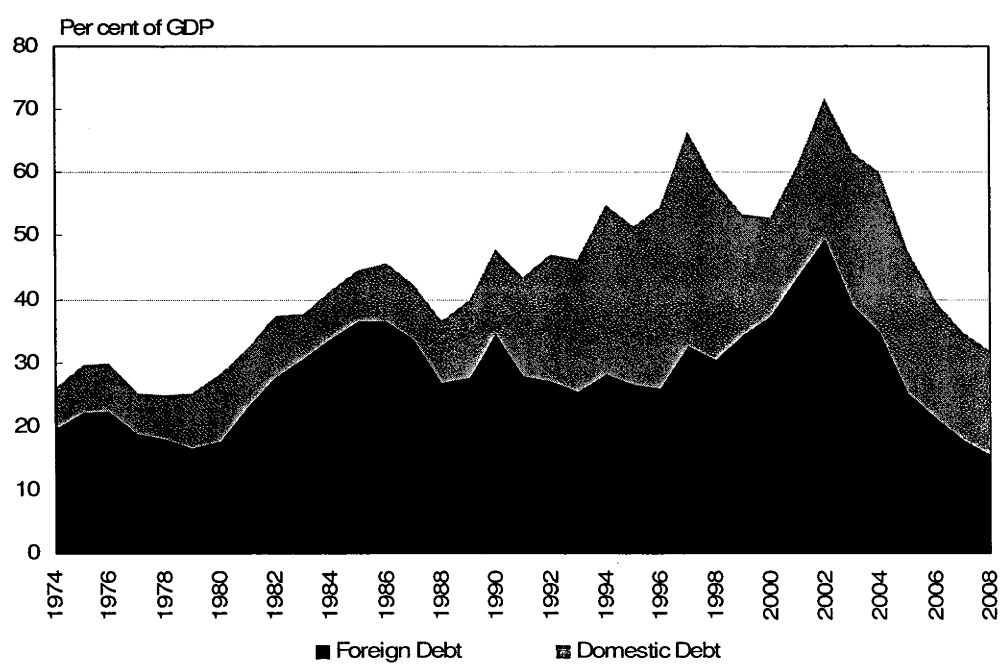
[90] The 1999 budget, for example, demanded a 20 per cent cut in public service employment numbers with the retrenchment of 7,000 public servants, well beyond the 2000recommendation made by the World Bank. In the event, however, the large cost of carrying out these retrenchments remained unfunded and only limited reductions in public sector employment numbers took place (Standish 1999).

bodies including a large number of research and educational institutes. It was widely reported during this time, for example, that a number of universities had lost up to 20 per cent of their government grants, which led to the closure of entire teaching programs (Standish 1999).

As a result, one of the most dramatic impacts of the 1999 fiscal crisis was to initiate a large decline in the funding of the education sector which fell from its high of K120 per capita in 1999 to a low of K35 per capita in 2004. Infrastructure funding also declined during this period from K45 per capita in 1999 to a low of K15 per capita in 2001, whilst health funding remained relatively constant at just under K40 per capita, albeit still following a path of long term decline since the mid 1980s. Despite these cuts to education and infrastructure spending, reductions in other general government expenditure were not forthcoming. Indeed, between 1998 and 2000, expenditure in the general category actually rose substantially from K350 per capita to K425 per capita.

Government expenditure increased further in the lead-up to the 2002 election beginning another period of expenditure overshooting. With a contraction of the mining and oil sectors, real GDP growth declined by 0.15 per cent adding further pressure to the fiscal position. Given the government's poor credit rating, the 2002 budget deficit had to be funded largely by domestic sources. When combined with foreign debt levels, this meant that total government debt reached a peak of just over 70 per cent of GDP in 2002.

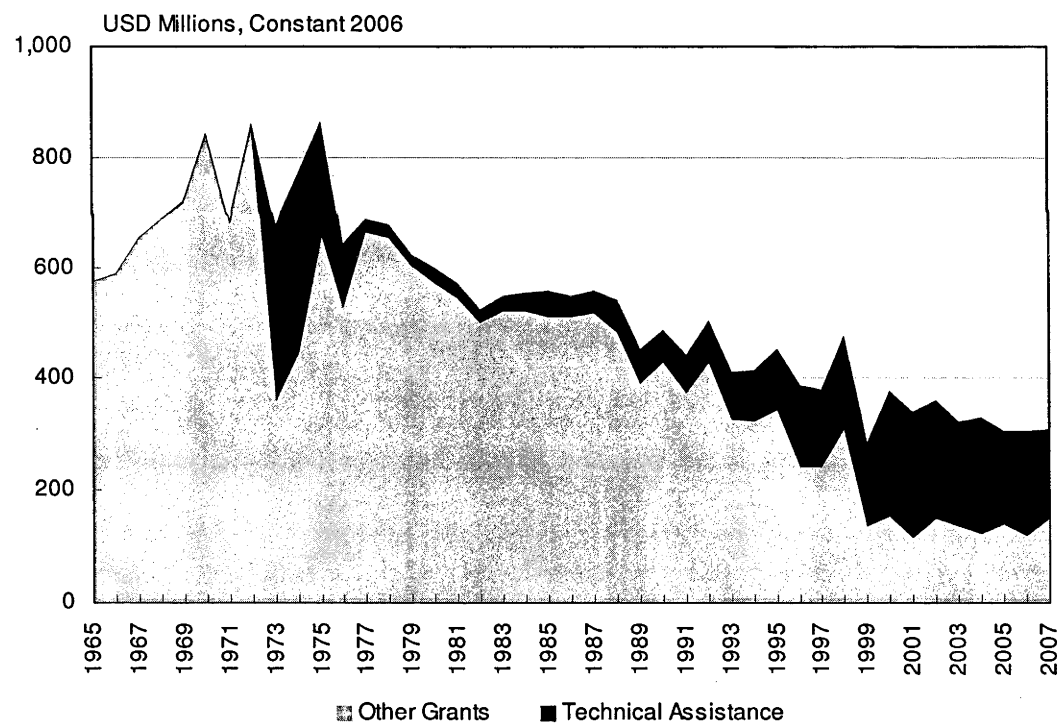
Chart 4.6: Public Debt—Foreign vs. Domestic (1974–2008)



Source: Government PNG Budget Documents (various years), see Appendix 5.1.

In response to a growing perception of deteriorating public sector capacity with the PNG bureaucracy and the continued weak demand for economic reform, the late 1990s also saw an expansion of Australian financial assistance given through bureaucratic support, or technical assistance programs (Chart 4.7). The Australian aid program also began to respond to criticisms surrounding project aid which, due to its tighter expenditure requirements, had dramatically reduced PNG Government control and ownership over the aid program and had created various political tensions between the two governments (Dorney, 1998; AusAID, 2003a:51).[91] In particular, an increasing focus began to be placed on delivering program aid and sector wide approaches (SWAp), which attempted to correct many of the inadequacies of project-based aid by delivering resources through 'single sector policy and expenditure programs, under [recipient] Government leadership, adopting common approaches across the sector, and progressing towards relying on Government procedures to disburse and account for all public expenditure' (Hamblin 2006:1).

Chart 4.7: Foreign Grant Aid in PNG: Technical Assistance vs. Other Grants



Source: OECD DAC (2008).

[91] AusAID (2003a:51), for example, notes that project aid in PNG 'had created parallel systems, led to negative institutional impacts in the areas of capacity building and priority setting, and reduced prospects for sustainability'. Likewise, Dorney (1998) argues that '[w]ith increasing numbers of Australian officials and consultants delving into all these areas of PNG government responsibility...the range of points of irritation had grown exponentially.'

4.3.5 Commodity Boom and Economic Recovery (2003–08)

On the back of a rise in global commodity and agricultural prices, the economic and fiscal situation improved dramatically from 2003. Strong resource and agricultural sectors flowed on to growth in a number of other industries such as construction and services. This contributed to a 46 per cent increase in government revenues between 2003 and 2005 as well as a 120 per cent growth in foreign exchange reserves. Real GDP growth was strong, recording 2.1 per cent, 2.7 per cent and 3.4 per cent in 2003, 2004 and 2005, respectively. Inflation also scaled back to a moderate 2.1 per cent growth and 1.7 per cent growth in 2004 and 2005 following a high of 14.7 per cent in 2002.

The culmination of Australia's growing focus on technical assistance also occurred during this period, with the commencement of the ECP[92] in 2004. The implementation of this program followed the adoption of a more general interventionist approach to aid delivery by Australia within the South Pacific region in an attempt to strengthen law and order and to help improve the quality of economic and public sector fiscal management.[93] To achieve this, the ECP augmented AusAID's pre-existing technical assistance programs by deploying more than 40 Australian government officials across a range of areas in the PNG bureaucracy, based mainly in central government agencies (Morauta 2005:160).

Whilst global commodity prices played a large part in the fiscal and economic progress made since 2002, the deployment of these officers coincided with some improvements in fiscal and economic management. The revenue windfalls of the 1990s, for example, had led to more than proportionate increases in spending, worsening fiscal outcomes and increasing government debt. In the present case, however, a significant proportion of the increased revenues were used to retire government debt—with total liabilities falling from 72 per cent of GDP in 2002 to 47 per cent in 2005.[94] Also, for the first time in a number of years, the wages and salaries bill of national departments remained relatively constant, although continued growth over the previous decade meant that it was still consuming almost half of the government's total recurrent expenditures, at 49.3 per cent (ADB 2004).

---

[92] During April 2008, the ECP was subsequently renamed the Strongim Gavman Program (Tok Pisin for 'strengthening' or 'empowering government') or SGP.

[93] In its initial phase, the ECP also included the deployment of Australian Federal Police to Port Moresby. However, PNG's Supreme Court ruled in May 2005 that the immunity granted to Australian ECP personnel from prosecution for any misconduct whilst on duty was not consistent with the PNG Constitution. As a result, over 150 Australian police were withdrawn from the program.

[94] This was also in compliance with the Public Finances (Management) Act, which stated that 90 per cent of un-forecasted revenues were used to retire government debt (IMF 2006:31).

Real GDP increased by 2.6 per cent in 2006, which would have been higher but for a contraction in some agricultural exports which were adversely affected by bad weather.

Continued high prices for copper, gold and oil, as well as for palm oil and logs, then led to larger than expected revenue growth in 2006 and a 1 per cent of GDP budget surplus—against an original deficit target of 0.6 per cent of GDP (GoPNG 2006). Total debt fell to just over 42 per cent of GDP, whilst external debt was brought down to 21 per cent of GDP.

Despite concerns over potentially high spending in the lead-up to the election, the government recorded another budget surplus equal to 1.7 per cent of GDP in 2007 on the back of continued oil and mining revenues and a 6 per cent real GDP growth rate. This allowed debt levels to fall further to 35 per cent of GDP, underwritten by the paying down of external debt in particular. The surplus outcome did, however, mask an almost 20 per cent increase in total expenditures for the year as the government sought to allocate additional resources towards investment priorities such as the rehabilitation of public infrastructure, direct investment in economic projects and the repayment of debt.

The impact of these additional revenues on increasing spending on key development items was, however, limited by implementation issues as many of the funds went largely unspent—eventually being allocated to various government trust accounts. For example, if unspent funds were treated as savings, the budget surplus in 2007 would have been equal to 11.4 per cent of GDP (ADB 2008).

Some improvements in funding for key development sectors were made however. Infrastructure spending increased from K25 per capita in 2004 to K65 per capita in 2007, health spending increased from K22 per capita in 2002 to K51 per capita in 2007, and education spending increased from a low of K30 per capita to K43 per capita in 2007. Nevertheless, despite comparable real per capita aggregate revenue and expenditure the funding for these items still remained significantly below those experienced during the 1970s and 1980s and prior to the Bougainville crisis. In the case of education, for example, funding was still half of what it was two decades prior in 1988.

In contrast, the general expenditures category continued to increase dramatically reaching record levels with its rise from K315 per capita in 2002 to K570 per capita in 2007. Although, as mentioned, a large portion of these additional revenues were allocated to debt

repayment. These expenditure trends then remained relatively constant in 2008, with continued strong economic and revenue growth—spurred by real GDP growth reaching 6.6 per cent from continued high export prices, and the improved level of business confidence arising from more sensible economic management.

4.4 Discussion and Conclusion

By providing foreign financial assistance, both Australia and other donors have tried to influence the public expenditure outcomes of the PNG Government. The period of budgetary support attempted to alleviate the aggregate fiscal constraints facing PNG, in order to reduce its need for deficit financing whilst still allowing the government to make substantial investments in human and physical infrastructure. Frustration at the composition and quality of the PNG Government's expenditure then led to the implementation of earmarked forms of aid delivery such as project aid, and later, program aid. Whilst also alleviating the macro fiscal constraints, this was targeted at ensuring aid funds were spent on purposes in line with the donor's preferences. During the current decade, Australian aid has become increasingly focused on trying to improve the efficiency of the PNG public sector in using both donor and domestic resources to produce desirable social and economic outcomes. This has led to a growing use of technical assistance programs aimed at strengthening state institutions and bureaucratic capacity as well as an adoption of programmatic aid providing sectoral support more integrated with local PNG systems and processes.

The links between this financial support and PNG's fiscal behaviour, economic performance and social welfare outcomes have, however, not been as straightforward as both Australia and other donors may have liked. In terms of alleviating resource constraints, the historical analysis has shown that despite a substantial flow of foreign aid, a persistent lack of fiscal discipline has meant successive PNG Governments have continued to rely on high levels of deficit financing to meet their expenditure requirements in the post independence period. This has led to the need for three donor bail-outs during the 1990s and early 2000s in order to prevent the collapse of the domestic economy.

The analysis has also shown that despite being a key motivation for switching between budgetary support and project aid, the switch in aid modalities has not led to any significant improvement in the composition of total government expenditures towards key development sectors. In fact, following the switch between the two aid modalities there has even been, in some cases, a further deterioration in the quality and composition of sectoral

expenditure levels. This view is supported by AusAID (2003a:27) which states that 'analysis of the PNG Government's own funding for different sectors confirms that government funding for key sectors such as infrastructure, health and education was higher when PNG was receiving budget support than in more recent times.'

Of course, domestic budgetary reallocations in response to an inflow of earmarked foreign assistance are not necessarily a problem. Even when aid finance is treated as being fully fungible, if the recipient's public sector expenditure composition is satisfactory then the donor is likely to contribute to the alleviation of resource constraints in important sectors. However, as PNG continues to fall further behind, both in the region and globally, in achieving key welfare targets such as those of the MDGs, and as expenditure for key development sectors such as health, education and infrastructure continue to lag behind pre Bougainville crisis levels, it is clear that the government's expenditure composition requires significant improvements if long term welfare targets are to be achieved.

This raises obvious questions about how the delivery of aid has encouraged the PNG Government to behave and what foreign aid has ultimately financed. It also raises the question of how this assistance has contributed to the capacity of the PNG public sector to utilise these resources effectively to achieve improvements in social welfare outcomes.

Despite being a central concern of nearly all assessments of aid effectiveness in PNG, to date no studies have attempted to measure the extent to which successive PNG governments have treated the delivery of project and program aid as an augmentation of their own resources or allowed donor funding to simply replace their pre-existing allocations. In addition, despite AusAID's own acknowledgement that sectoral funding outcomes have declined since the introduction of project aid, no studies have sought to measure the extent to which both types of aid have contributed to improving fiscal expenditure priorities. The following chapters seek to address these questions.

Chapter 5: Foreign Aid and Fiscal Aggregates in PNG

5.1 Introduction

Chapter 4 highlighted that the effects of aid on economic outcomes in PNG involve a complex set of interactions between the public sector bureaucracy and key fiscal aggregates. The endogeneity of these relationships also suggests that an adjustment in any one of these aid or fiscal variables is likely to have important knock-on effects with each of the other fiscal outcomes. This chapter seeks to analyse these relationships with the use of a Vector Error Correction Model (VECM) which allows aid and fiscal aggregates to interact in a dynamic manner, both contemporaneously and with a number of lags.

Empirical studies on the impact of aid on PNG's fiscal performance have been hampered by a chronic lack of consistent data on PNG's fiscal outcomes. This chapter contributes to the literature by undertaking an extensive data collection exercise with assistance from staff from the PNG Department of Finance and Treasury. This allows the study to draw on a data set from 1974–2008. This covers the entire post independence period and gives sufficient degrees of freedom to conduct a dynamic analysis of PNG's fiscal behaviour following inflows of foreign aid.

Based on the historical analysis presented in Chapter 4, this chapter will focus in particular on testing a number of hypotheses regarding the impact of aid on fiscal aggregates such as public debt, domestic taxation and expenditure levels in the post independence period. These include i) whether grant aid has tended to lower the PNG Government's domestic revenue-raising efforts, ii) whether grant aid has encouraged the PNG Government to be less fiscally responsible and to accumulate higher levels of foreign debt, iii) whether grant aid has encouraged higher rates of non productive expenditure, and finally, iv) whether budget support vis-à-vis project and program aid have had differential effects on any of the above. In order to investigate these issues, three separate models shall be estimated. The first analyses the interaction between aggregate grant aid, taxation, total expenditure and borrowing levels. The second model then disaggregates government expenditure into what are termed 'development' and 'general' categories, whilst the third disaggregates foreign grants into budget support and project/program aid.

This analysis reveals a number of important insights regarding the interplay between foreign aid and public sector fiscal behaviour in post independence PNG. Key findings include evidence that grant aid has been an important source of debt reduction. Grant aid has, however, also tended to erode the domestic tax collection. The combination of these

two effects means that foreign grants have contributed little to increasing aggregate expenditure levels. Preliminary evidence is also presented that suggests some of these effects vary considerably across different types of grant aid delivery. A number of policy implications of these findings are discussed in the final section.

5.2 Literature Review

5.2.1 Impact of Aid on Fiscal Aggregates—Fiscal Response Models

Traditionally, the impact of foreign aid on fiscal aggregates has been analysed with the use of Fiscal Response Models (FRMs). This approach is based on a utility-maximising government which sets itself targets for a variety of expenditure, revenue and borrowing outcomes. The government is assumed to maximise its utility by obtaining each one of these fiscal targets during each period. An inflow of aid is then assessed on the basis of its affect on each of the expenditure, revenue and borrowing targets, subject to budget and expenditure composition restraints.

Heller (1975) was one of the first to use this approach, analysing a cross section of 11 African countries between 1961 and 1971. The author finds that between 30 and 60 per cent of aid was used for additional government spending whilst the remaining funds were used to reduce the level of domestic tax and borrowing. On the expenditure composition side, the author also found that 'aid causes a strong shift away from public consumption and toward investment' (Heller 1975:442).[95]

Heller (1975) spurred a range of other papers on this topic which have made some important methodological improvements to the literature. Binh and McGillivray (1993), for example, illustrated that the linear-quadratic loss functions which were used for government utility in earlier studies were incorrectly specified in the sense that achieving each of the expenditure targets did not lead to an unconstrained maximum for their utility functions.[96] The authors then developed a quadratic loss function which allows for equal losses in utility from both over and under achieving each of the target variables whilst

[95] In contrast, Gang and Khan (1991) find, using time series data for India between 1961 and 1984, that aid has tended to lower domestic tax collection. However, in this case the authors also found that aid encouraged higher levels of government investment, with the majority of funds being spent on earmarked projects.

[96] This utility function for government expenditure is thus generally written as:

$$U = \rho_0 - \frac{\rho_1}{2}(E - E^*)^2 - \frac{\rho_2}{2}(D - D^*)^2 - \frac{\rho_3}{2}(T - T^*)^2 - \frac{\rho_4}{2}(A - A^*)^2 - \frac{\rho_5}{2}(B - B^*)^2$$

leading to a maximum solution following the obtainment of all the respective target variables.[97]

Subsequent authors have made a number of additional extensions to the literature by specifying more realistic budget constraints and by incorporating aid into the theoretical model as an endogenous rather than exogenous parameter (Franco-Rodriguez et al. 1998; McGillivray and Ahmed 1999). Mavrotas (2002) analysed the various impacts of disaggregated types of aid,[98] whilst Feeny (2006) developed an asymmetric utility specification which allows for larger losses in utility from revenue under-shooting than over-shooting.[99]

Feeny (2007) provides the most recent study on the impact of aid on fiscal performance in the Pacific Island countries, focusing on Melanesia (Fiji, PNG, Solomon Islands and Vanuatu) for the period 1989–2002. Here the author finds that whilst aid flows have impacted positively on development vis-à-vis recurrent expenditures, they have also led to a significant reduction in domestic revenue collection. Highlighting that this has the potential to exacerbate problems of long term aid dependency, Feeny (2007:448) argues that donors should direct more effort towards strengthening revenue management in addition to their traditional focus on public expenditure.

5.2.2 Impact of Aid on Fiscal Aggregates—Dynamic Approaches

The FRM literature has, however, increasingly been shown to suffer from a number of limitations. Criticisms have included the over simplification of government fiscal behaviour with utility based on a loss function, a number of studies recording estimates of the model's structural parameters which are inconsistent with the theoretical model, and that in practice the fiscal target variables used to specify the government utility function are unobservable, meaning that they have to be estimated from past values (White 1994;

---

where E represents government expenditure, D public debt, T taxation revenue, A foreign aid, B is borrowing and each of the starred variables represent their respective target values. The government budget constraint states that total domestic government expenditure (investment and consumption) plus debt servicing costs must equal total domestic revenue generation plus foreign aid receipts and borrowing from all other sources. These models are then solved to reveal both the structural and reduced form parameters of the model and estimated with a systems equation approach, generally non linear Three Stage Least Squares.

[98] The focus by Mavrotas (2002) on disaggregated aid—estimating data for India and Kenya over the period 1973–1990 and 1973–1992, respectively—led the author to conclude that for both countries, project aid has been less likely to displace other sources of government funding as compared to untied forms of aid, such as general budgetary support.

[99] Feeny (2006) argues that in practice, discussions with relevant policy makers almost always indicate a clear preference for over-shooting as opposed to under-shooting. He develops an asymmetric utility function incorporating these preferences. Whilst more appealing from a theoretical perspective, this approach is, however, shown to give comparable empirical results as the symmetric utility function.

McGillivray and Morrisey 2001a; Osei et al. 2003). Perhaps the most important limitation of FRMs, however, is the implicit assumption that government fiscal behaviour remains static. As argued in McGillivray and Morrisey (2001a:30) in reality one would expect 'the impact of aid on fiscal behaviour to change over time. Indeed, the rationale for attaching policy reform conditions to aid is to alter behavioural responses.'

As a response to these criticisms, dynamic Vector Autoregressive (VAR) approaches have become an increasingly popular tool for modelling the relationship between aid and fiscal aggregates. This approach uses multivariate VAR models to estimate long run (cointegrating) relationships between each of the fiscal variables (Fagernäs and Roberts 2004b).[100] In addition, given the atheoretical nature of VAR models, this means that it is not necessary to estimate the unknown target values required for the structural representation of FRMs (Osei et al. 2003:2).[101] This approach also facilitates the use of Impulse Response Functions (IRFs) to trace the dynamic effect on the system of an exogenous shock to one of the variables through deviations of the shocked time paths from the expected time path given by the model.[102] Further, these IRFs capture the impact of the feedback effects which occur between each of the aid and fiscal policy variables.

Although still a relatively new component of the aid effectiveness literature, a number of country-level studies have recorded some important findings. Sugema and Chowdhury (2005), for example, find that in Indonesia, project aid allocated to development activities has been used to increase what they term 'routine' expenditures, suggesting that aid has been fungible across the two activities. These authors also find that aid flows have tended to make the Indonesian government fiscally lazy, as the availability of aid has acted as a disincentive to mobilise domestic revenue through a more efficient and effective taxation system.

[100] See, for example, Johansen (1988) and Johansen and Juselius (1992).

[101] In essence, assumptions about the exogeneity of each of the explanatory variables can also be tested within the VAR using data, rather than imposed a priori, and can then be applied to simulate the effect of aid injections via impulse response analysis.

[102] The final advantage of the VAR approach is that it provides a highly tractable framework unlike FRMs, which require significant effort in determining the structural coefficient estimations from the reduced form parameters (Franco-Rodriguez 2000). The VAR approach also treats aid and fiscal behaviour as interdependent, where an adverse shock on the fiscal side will have follow-up impacts on aid. For example, a fall in domestic revenue may generate the need to increase aid inflows. In exchange, there are also feedback effects from aid—the availability of aid may reduce the need to adjust revenue sources or budgeted expenditure. Thus, rather than the uni directional relationships posited by FRMs, aid and fiscal policy in the VAR framework interact in a dynamic manner.

Fagernäs and Roberts (2004a) study Zambia between 1964 and 2001[103] and show that an injection of foreign aid is accompanied by sustained higher levels of both recurrent and capital expenditure levels. Aid inflows have, however, also been associated with lower domestic revenue receipts as well as higher levels of domestic borrowing. This suggests that, rather than using aid funds to stabilise the economy, the government has tended to take the opportunity to relax fiscal and macroeconomic controls as aid has permitted public expenditures to rise well above levels able to be financed from domestic resources.

In contrast, Osei et al. (2003) find that for Ghana between 1966 and 1998, foreign aid has been associated with reduced domestic borrowing and increased tax effort, combining to increase public spending by more than the initial aid inflows. Fagernäs and Schurich (2004) also find similar results for their study of Malawi over the period 1970 to 2000, concluding that external finance has had a positive long run impact on the government's development budget whilst having a negative impact on levels of domestic borrowing–and no impact on the domestic tax effort.

5.2.3 Research Gap

The diversity of results observed across countries indicates that public sector bureaucracies respond in vastly different ways to inflows of foreign financial assistance. Applying these methods to a case study of PNG will give valuable insights into the impact of aid on fiscal performance. However, one limitation of both the VAR and FRM literature has been its assessment of expenditure priorities.[104] As discussed in Chapter 4, a key criticism of Australian aid in post independence PNG has been the perception that it has deteriorated the government's expenditure priorities towards unproductive sectors of the economy. The literature assessing the impact of aid on 'development' and 'non development' related expenditure has, however, focused almost exclusively on recurrent and development (capital) budget classifications (see Fagernäs and Roberts 2004a; Fagernäs and Schurich 2004; Sugema and Chowdhury 2005).

---

[103] In this case, the authors use a VAR rather than VECM approach as each of the fiscal aggregate variables was found to be stationary and hence there was no need to estimate a VECM model. Notably, in this case the impulse response analysis can only be used to examine the effects of a one-period increase in aid, whereas in the case of the VEC model used for Uganda and Malawi, only a permanent increase in the level of aid is feasible (as the model is run with differenced variables) (Fagernäs and Roberts 2004a:33).

[104] Even the FRM literature is relatively unclear on this issue. Mavrotas (2002), for example, finds that project aid has been less likely to displace other sources of government funding as compared to untied forms of aid, supporting the conclusion that tying aid to specific projects may help to limit the adverse effects of fungibility, whereas program aid can be more easily treated as a fungible addition to government resources. Ouattara (2006), on the other hand, suggests that simply providing debt reduction could be a more effective policy tool than additional aid in financing pro poverty expenditure as well as public investment.

In practice, development orientated expenditures often involve a large portion of recurrent costs. Personal emoluments of teachers and doctors are a good example of this, as is road maintenance. Likewise, development budgets are not necessarily comprised of expenditure which may be considered pro poor or even pro growth. This issue is raised in Feeny (2007:448), who argues that 'donors financing items such as the wages of health and education workers is arguably no less developmental than the construction of schools and hospitals.' In addition, aid has also often led to a need for higher levels of ongoing recurrent expenditures, particularly in Melanesia, which has received large proportions of foreign aid in the form of projects (Feeny 2007). This chapter adopts an alternative method of allocating expenditure priorities, using a sectoral rather than functional basis. As shall be discussed shortly, development sectors are said to include health, education, infrastructure, and law and order.

Another limitation of the VAR literature has been its treatment of aid as a homogenous good. As discussed in Chapter 4, a key motivation for the shift in Australian financial assistance from budgetary support to project aid was the perception that untied financial support had been encouraging the growth of unproductive consumption expenditure and had reduced the motivation for domestic tax collection. Scaling-up the proportion of grants given as project-based aid was thus seen by Australia as a method of ensuring that allocated funds were used on pro development activities rather than general government consumption. Whether or not this has impacted on the fiscal behaviour of the PNG Government has, however, not been systematically reviewed. Another issue which this chapter seeks to address is whether different types of aid delivery have led to different fiscal outcomes in post independence PNG.

5.3 Estimation Method and Issues

VAR models can be broadly classified as a multivariate extension of Granger causality testing, where each of the dependent variables is a function both of lagged values of themselves and a number of other endogenous explanatory terms (Enders 2003). In its most basic form, a two-variable VAR model can be written as:

$$\begin{aligned} X_t &= c_{10} + \sum_{i=1}^{n} \alpha_{1i} X_{t-i} + \sum_{i=1}^{n} \alpha_{2i} Y_{t-i} + \varepsilon_{X_t} \\ Y_t &= c_{20} + \sum_{i=1}^{n} \alpha_{3i} X_{t-i} + \sum_{i=1}^{n} \alpha_{4i} Y_{t-i} + \varepsilon_{Y_t} \end{aligned} \tag{5.1}$$

where the α_i's capture the impact of each of the jointly determined (endogenous) X_t and Y_t variables. The equation is estimated with a data set covering the periods $t=1,...,T$ which gives a white noise error term equal to ε_t with $E(\varepsilon_t)=0$. The i's measure the degree to which each of the fiscal variables are jointly determined not only with the other variables but with lagged values of themselves. In the current case, this approach allows the estimation to capture the effect of current budgetary decisions being influenced by the current fiscal situation as well as lagged impacts of previous periods' outcomes.[105]

VAR analysis does, however, require some assumptions to be made about the nature of the time series being estimated. Most importantly, each of the variables must be stationary (Hamilton 1995:651). Non stationary time series are defined by a stochastic process which has a mean and/or variance which changes over time causing the covariance structure to be time dependent (Gujarati 1995:792). However, in the case that each variable is non stationary, and it also satisfies the requirement of being integrated of the same order, typically I(1), then this analysis can be extended to a VECM framework. In this case, each of the variables is first differenced to establish stationarity, and then these differenced variables are applied to the VECM framework via Granger's representation theorem (Engle and Granger 1987). The linear combination of these variables may then be interpreted as long run relationships, or, in economic terms, as static equilibrium relations (Johansen 1988; Johansen and Juselius 1990). In this case the estimation of the variables given in Equation (5.1) can be written as:

$$\begin{aligned}\Delta X_t &= c_{10} + \alpha_X \psi_{X,t-1} + \sum_{i=1}^{n} \alpha_{1i} \Delta X_{t-i} + \sum_{i=1}^{n} \alpha_{2i} \Delta Y_{t-i} + \varepsilon_{X_t} \\ \Delta Y_t &= c_{20} - \alpha_Y \psi_{Y,t-1} + \sum_{i=1}^{n} \alpha_{3i} \Delta X_{t-i} + \sum_{i=1}^{n} \alpha_{4i} \Delta Y_{t-i} + \varepsilon_{Y_t}\end{aligned} \tag{5.2}$$

where Δ is the difference operator such that $\Delta X_t = X_t - X_{t-1}$ and i again refers to the number of lags in the model. Of central interest are the $\alpha_X \psi_{X,t-1}$ and $\alpha_Y \psi_{Y,t-1}$ 'error correction' terms which represent the stationary linear combination of the cointegrated variables (Johansen 1988). The coefficient on the error correction term, α, thus represents the speed of adjustment to a disequilibrium in any of the fiscal variables. As such, the larger

[105] This representation treats aid and fiscal behaviour as interdependent, where a shock to the aid variable will have follow-up impacts on the fiscal variables and vice versa. In the case of foreign aid, this is intuitively appealing due to its likely lagged effects on the budgetary process. For example, a fall in domestic revenue may generate the need to increase aid inflows. In exchange, there are also feedback effects from aid—the availability of aid may reduce the need to adjust revenue sources or budgeted expenditures. Thus aid and fiscal policy can be said to interact in a dynamic manner.

the coefficient the greater the adjustment of the dependent variable to the deviation from a long run equilibrium in the previous period (Dolado et al. 2001:638).[106]

The estimated coefficients of VECM do not, however, incorporate the full flow-on effects of changes in each of the variables, given that they are linked both contemporaneously and with a lag. The coefficient of a shock to aid on government revenue, for example, will capture the direct impact but will not capture the possible effect that this aid shock might have if it leads to an increase in expenditure, and the subsequent effect that higher expenditures might in turn have on revenue collection and so on.

These flow-on effects of changes in foreign financial assistance are captured with the use of IRFs (Pesaran and Shin 1998). IRFs have the advantage of showing the complete time profile of the effect of a shock to one variable (this study will focus on shocks to aid flows) both on the current and future values of all other endogenous fiscal aggregate variables. In doing this, they capture both the direct feedback effects caused by the endogeneity of the variables over time (Osei et al. 2003:13).

The impulse is made through the residual in the aid equation with a one standard error shock. Given that the VECM is estimated in first differences, a shock or impulse to aid is expected to have a persistent impact on the levels of other variables, as the shock itself is permanent in nature (Pesaran and Shin 1998). Whilst the shocks are permanent, the impulse responses—provided that they meet standard stability requirements—are eventually expected to converge to a level that is consistent with the estimated long run, cointegrating relationship estimated in the VECM.[107]

Like FRMs, the VECM procedure also has limitations. This includes the potential to over parameterise the model with limited degrees of freedom, given that each of the variables is deemed to affect the others both contemporaneously and with lags (Fagernas and Roberts 2004a:31). Results obtained with both VAR and VECM have also been shown to be sensitive to the number of lags chosen for the analysis (Stock and Watson 1993), although this can minimised by using a number of tests to determine appropriate lag length. Another

[106] For example, if each of the fiscal variables is cointegrated, then each of the disequilibrium error terms will be stationary. This means there is a force pulling the residual errors towards zero, with previous departures from equilibrium being corrected by changes in some or all of the fiscal variables.

[107] Another limitation of the IRF approach is the potential under identification of the estimated system given that all effects of omitted variables are thus assumed to be incorporated in the innovations. In light of this, the coefficient estimates are likely to represent Granger causality rather than pure causality (Engle and Granger 1987).

limitation of this approach is the lack of confidence intervals for the IRFs. As such, the impulse responses can only be generally interpreted as indicative of the actual impact, which may be within a range of that estimated (Fagernäs and Schurich 2004:24).

5.4 Data Collection

5.4.1 Measuring Foreign Grants

A number of options are available to measure the amount of foreign grants received by PNG in the post independence era. The first is through the OECD DAC database which provides information on both donor commitments and disbursements to PNG between 1974 and 2006.[108] A case can be made for the use of aid commitment data in fiscal impact studies, given that this data reflects the amount of aid that recipient countries expect to receive, making it more likely for the data to influence recipient countries' budgetary decisions. As can be seen in Chart 5.1, however, in the case of PNG the aid commitment data is lumpy with large fluctuations across relatively short time periods.[109]

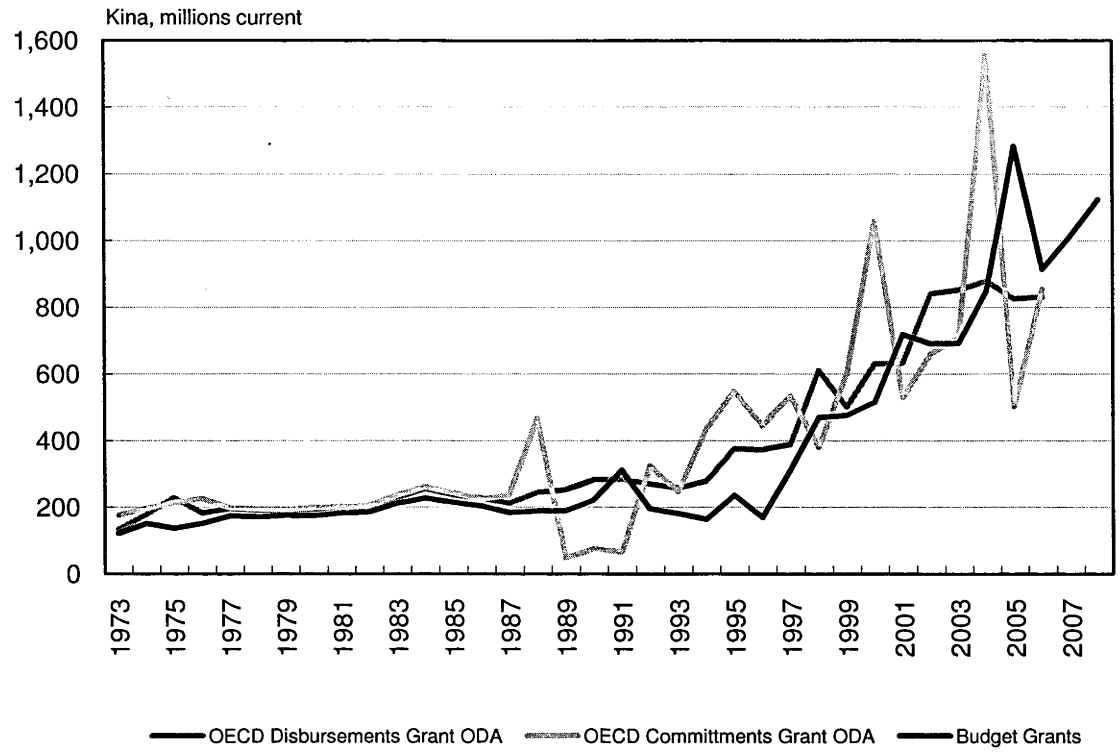
In contrast, the alternative aid disbursement data tends to be less volatile and reflects the actual amount of aid transferred by donors to the recipient. A limitation of this data is that because it is recorded via donor reporting it need not necessarily be channelled through the recipient government's budget process. Chart 5.1, for example, also compares the amount of total grant disbursements received by PNG recorded by the OECD DAC with the amount of grants which have appeared within the PNG national budget. The OECD disbursements data is almost always larger than those receipts recorded through official government grant receipts, indicating that not all official aid recorded with the DAC is channelled through domestic budgetary processes.

---

[108] OECD DAC (2007) defines an aid commitment as a firm obligation, expressed in writing and backed by the necessary funds, undertaken by an official donor to provide specified assistance to a recipient country or a multilateral organisation. Bilateral commitments are recorded in the full amount of expected transfer, irrespective of the time required for the completion of disbursements. The definition of aid disbursements on the other hand is defined as the release of funds to, or the purchase of goods or services for, a recipient. Disbursements record the actual international transfer of financial resources, or of goods or services valued at the cost of the donor.

[109] Whilst not explained within the database, a potential explanation of this is the tendency of donors to make announcements over large commitments to foreign aid in a particular year which are then evened out over a number of years given the practicalities of implementation.

Chart 5.1: Foreign Aid Receipts in PNG—OECD DAC vs. Official Budget Data (1973–2008)



Source: OECD DAC (2008) and author's calculations (see Appendix 5.1).

Indeed, on average, 21 per cent of grants recorded with the DAC have not been recorded within the official budget figures (see Appendix 5.2). One explanation for this is that donors have often found it less onerous to carry out aid projects without channelling funds though the national government (Feeny 2007:442). This circumvents the need to use existing government systems and avoids potential conflict with recipient officials. This point is highlighted by the growing divergence between the amount of aid that was being declared to the DAC and which was appearing on official budget documents during the late 1980s and 1990s when the shift from direct budgetary support to project aid was taking place. Another reason could be the widespread deterioration in economic mismanagement which occurred during this period (Chand 2002:6) and a corresponding decline in the quality of fiscal reporting.

Given that the primary interest of this analysis is the impact of aid on aggregate fiscal performance, the decision is made to use those aid flows which appear on-budget. In PNG, public sector officials are typically unlikely to be aware of the amount of spending in off-budget aid activities and it is therefore assumed that they do not incorporate them into their expenditure and revenue raising decisions. In addition, a large portion of PNG grant aid is received by various non government organisations and other aid charities so would

be unlikely to affect budgetary decisions. The underlying assumption of this chapter then is that public sector agencies and officials respond to on-budget aid flows rather than off-budget ones.

This chapter draws on aid data (disaggregated between budget support and project/program aid) collected from official PNG Government budget documents from 1974 to 2008 (see Appendix 5.1 for a full explanation). This 35-year data set matches or exceeds the degrees of freedom offered in most other papers within the literature.

5.4.2 Measuring Development and Non Development Expenditures

Papers seeking to assess the impact of aid on the quality of public expenditure have typically used the recurrent and development (capital) budget classifications (Fagernäs and Roberts 2004a; Fagernäs and Schurich 2004; Sugema and Chowdhury 2005). This chapter seeks to extend this analysis by focusing on the classification of government expenditure according to its function. This requires an extensive data collection exercise involving a number of steps. In the first instance, the IMF Government Financial Statistics (GFS) (2008) database was used to allocate spending to four development expenditure categories—health, education, infrastructure, and law and order. All remaining spending is then placed into the 'general' category. The choice of these sectors reflects their importance in improving the country's development performance and the key role they play in PNG's prospects of lifting its rate of achievement against the MDGs (World Bank 2007; World Bank 2008).

Secondly, to fill in a number of years of missing data between 2002 and 2008, the functional allocations from volume II of the PNG national budget were also used to allocate recurrent expenditures into the same classification system as used in the IMF GFS database. These data were then added to the expenditure from the IMF data set and classified into two categories, development expenditures and general expenditures. A full listing of these recurrent budget allocations can be found in Appendix 5.1.

A difficulty of this approach is that functional allocations are not available for development budget expenditures. These expenditures were allocated from departmental records available in volume III of the budget documents. In this case, development expenditure for departments involved in the delivery of each of the four development categories was added

to the recurrent budget allocations to generate total development and general expenditure. A full listing of these development budget allocations can be found in Appendix 5.1.

5.4.3 Measuring Domestic Revenue and Public Debt Levels

For consistency, domestic revenue and public debt data is also taken from PNG national budget documents. Domestic revenue includes all revenue derived from company tax, personal tax and VAT as well as import and excise duties. Public debt includes the sum of all domestic and foreign debt liabilities owed by the government to both private and concessional lending sources. Net borrowing levels are then calculated from annual changes in this public debt data.[110] All variables are measured in constant 2006 Kina and taken as a percentage of GDP.

5.4.4 Descriptive Statistics

Table 5.1: Summary Statistics for Key Variables (1974–2008)

Variable	Description: *All Variables Expressed as a Per Cent of GDP*	Obs	Mean	Std. Dev.	Min	Max
ex	Total Expenditure	35	31.365	3.710	24.248	38.634
ex_d	Total Development Expenditure	35	11.683	2.491	7.352	15.949
ex_g	Total General Expenditure	35	19.683	3.558	13.407	28.668
dr	Domestic Revenue	35	22.038	4.927	10.472	33.169
gr	Grant Revenue	35	7.682	3.434	2.448	14.672
gr_bs	Grant Revenue—Budget Support	35	5.728	5.035	0.000	14.672
gr_pr	Grant Revenue—Program Support	35	1.954	2.618	0.000	8.406
pd	Public Debt	35	43.784	12.715	24.779	71.771
D.pd_d	Domestic financing of budget deficit (Domestic Borrowing)	35	0.284	3.089	-8.716	5.956

Table 5.1 provides the descriptive statistics of each of these variables along with their respective abbreviations. The average level of total government expenditure is 31 per cent of GDP. From this, approximately 12 per cent of GDP has been allocated to what have been termed development expenditures with the remaining 20 per cent of GDP being allocated to the general category. PNG's deficit bias can be seen by comparing the sum of average domestic revenue and grant revenue levels with total expenditure levels, which leaves a difference of approximately 2 per cent of GDP. The average level of public debt is 43 per cent of GDP, peaking at almost 72 per cent of GDP in 2002. Of this Government debt 67 per cent has been held by foreign creditors on average whilst the remaining 33 per

[110] As shall be explained shortly, domestic borrowing is emphasised here because external financing of the budget deficit is taken as the excluded variable to estimate the system of fiscal equations.

cent has been held domestically. The largest decline in domestic debt liabilities which occurred in a single year is 8.7 per cent of GDP whilst the biggest increase in domestic borrowing is 6 per cent GDP.

5.5 Estimation Results

The first step in the analysis is to establish whether the variables are stationary or non stationary. For this purpose, the Augmented Dickey-Fuller (ADF) and Phillips-Perron tests are used. The two tests produce supporting results. The ADF test results are presented in Table 5.2.[111] The results show that all the variables are found to be stationary at the 95 per cent significance level in their first difference form with the assumption of a constant only. All variables are non stationary and integrated of order 1, I(1). It is therefore appropriate to estimate models that include variables in their first differenced form through the VECM procedure.

Table 5.2: Stationarity Test for Key Fiscal Variables

Variable	ADF Test Stat	ADF Critical Value	ADF *p-value*	ADF Test Stat after 1st Diff	ADF Critical Value after 1st Diff	ADF p-value after 1st Diff	Stationary
ex	-2.242	-2.975	0.191	-6.120	-2.978	0.000	I(1)
ex_d	-1.605	-2.975	0.481	-6.815	-2.978	0.000	I(1)
ex_g	-1.565	-2.975	0.501	-5.637	-2.978	0.000	I(1)
dr	-2.073	-2.975	0.255	-6.872	-2.978	0.000	I(1)
gr	-2.060	-2.975	0.260	-5.776	-2.978	0.000	I(1)
gr_bs	-1.802	-2.975	0.379	-4.143	-2.978	0.001	I(1)
gr_pr	-0.896	-2.975	0.789	-7.090	-2.978	0.000	I(1)
D.pd_d	-1.543	-2.975	0.512	-4.784	-2.978	0.001	I(1)

5.6 Model I—Fiscal Aggregates

The first model incorporates the system of equations derived in Equation (4.11) into the VECM framework shown in Equation (5.2) to analyse the impact of grant flows on domestic revenue collection, aggregate expenditure and levels of domestic borrowing. For the purposes of estimation, external financing of the budget deficit is taken as the excluded variable from the system of equations. This is to avoid the estimation of an identity which would render any of the VECM results meaningless (Fagernas and Roberts 2008:38). This approach also places the focus of the results on the impact of aid grants rather than donor loans. This choice reflects that aid flows to PNG have been largely dominated by foreign grants rather than loans and are likely to continue doing so into the future, hence the

[111] Phillips-Perron test results available upon request.

results will have more practical policy implications.[112] Given this the following model is estimated:

$$\Delta DR_t = c_{10} + \sum_{k=1}^{r} \alpha_k \psi_{k,t-1} + \sum_{i=1}^{n} \alpha_{1i} \Delta DR_{t-i} + \sum_{i=1}^{n} \alpha_{2i} \Delta Y_{t-i} + \varepsilon_{DR_t}$$

$$\Delta D.PD\_d_t = c_{20} + \sum_{k=1}^{r} \alpha_k \psi_{k,t-1} + \sum_{i=1}^{n} \alpha_{3i} \Delta D.PD\_d_{t-i} + \sum_{i=1}^{n} \alpha_{4i} \Delta Y_{t-i} + \varepsilon_{D.PD\_d_t}$$

$$\Delta GR_t = c_{30} + \sum_{k=1}^{r} \alpha_k \psi_{k,t-1} + \sum_{i=1}^{n} \alpha_{5i} \Delta GR_{t-i} + \sum_{i=1}^{n} \alpha_{6i} \Delta Y_{t-i} + \varepsilon_{GR_t} \quad (5.3)$$

$$\Delta EX_t = c_{40} + \sum_{k=1}^{r} \alpha_k \psi_{k,t-1} + \sum_{i=1}^{n} \alpha_{7i} \Delta EX_{t-i} + \sum_{i=1}^{n} \alpha_{8i} \Delta Y_{t-i} + \varepsilon_{EX_t}$$

where DR_t is domestic revenue collection at time t, $D.PD\_d_t$ is domestic borrowing, GR_t is grant revenue and EX_t is total government expenditure. For expositional simplicity, Y_{t-i} equals a vector of the other three non dependent variables such that for the DR_t equation $Y_{t-i} = D.PD\_d_{t-i}$, GR_{t-i} and EX_{t-i}, where i is the number of lags chosen within the model. The $\psi_{k,t-1}$ term represents the cointegrating equation residuals so that the α_k terms represent each of the adjustment coefficients. The optimal lag lengths of the model are shown by r and n, and chosen by standard diagnostic tests. Each of the error terms is assumed to have the normal white noise characteristics.

Appropriate lag length is chosen on the basis of the Akaike Information Criterion (AIC) and Hannan-Quinn Information Criteria (HQIC) (Gujarati 2003:537). [113] In the current case, both AIC and HQIC are minimised with the use of 2 lags (Table 5.3, Appendix 5.3). The Johansen trace statistic test is then used to determine the cointegrating rank of the model.[114] The trace test rejects the null hypothesis of no cointegrating vectors but fails to reject the null hypothesis of 1 cointegrating vector. That is to say, that there exists one linear combination of the variables (Table 5.4, Appendix 5.3). The results of the cointegrating relationship amongst the variables within the VECM framework are presented in Table 5.5.

---

[112] As discussed in the final section, the focus of this analysis thus rests on the impact of foreign grants on the management of fiscal aggregates in PNG. This also stands as a significant limitation of the analysis with a comparison of the effects of foreign loans being a fruitful area for further research.

[113] It is also standard practice to test for evidence of residual serial correlation which will be done following the VECM estimations.

[114] This process is based on Johansen's trace test statistic which states that if the test statistic is greater than the Johansen critical value, the null hypothesis that there are v cointegrating vectors is rejected in favour of the alternative that there are more than v (Johansen, 1988; Maddala and Kim, 1998:211).

Table 5.5: Cointegrating Relationships for Model I

Normalised on Domestic Borrowing	Coefficients
D.pd_d	1
gr	1.715***
	(0.377)
dr	0.973***
	(0.227)
ex	-1.097***
	(0.241)

Standard errors in parenthesis. * p<.1; ** p<.05; *** p<.01. Johansen normalization restriction imposed on public debt.

In accordance with the VECM procedure, the cointegrating relationship is normalised, in this case with net domestic borrowing taking on a unitary value (Lutkepohl 1991). Because the variables show a long run equilibrium identity which is equated to zero a positive coefficient for one of the variables estimate suggests a negative *ceteris paribus* long run relationship with the normalised domestic borrowing variable. Likewise, a negative coefficient estimate suggests a positive *ceteris paribus* long run relationship with the normalised domestic borrowing variable.

A number of important results are found. Grant revenue has a highly significant positive coefficient estimate, suggesting that over the long term it has tended to act as a substitute for government borrowing. Similarly, higher levels of domestic revenue collection are also associated with reduced levels of domestic borrowing. Lastly, the expenditure variable is negative and also highly significant indicating that higher long run levels of government expenditure have been associated with higher levels of domestic borrowing. As explained, these cointegrating relationships do not reveal the direction of causality between each of these relationships. Indeed, although grant inflows appear to have acted as a substitute for domestic taxation it may still be possible for grant inflows to have a positive long run effect on domestic revenue collection, so long as each of the other variables also adjusts to balance the long run relation shown in Table 5.5. This could be the case for example if domestic borrowing also fell in response to the grant inflow. These flow-on effects are considered shortly with the use of the IRF analysis.

Table 5.6 presents the results of the VECM coefficients. The estimated coefficients for the error correction term reveal which of the variables adjust to correct imbalances in the fiscal situation whilst the variable coefficients show the short run effects of changes in the explanatory variables on the dependent variable.

Table 5.6: VECM Results for Model I

	1/ D_pd_d	2/ D_dr	3/ D_gr	4/ D_ex
L.D.pd_d	0.081	-0.076	0.066	-0.163
	(0.203)	(0.150)	(0.078)	(0.165)
L.gr	-0.285	-0.571	0.093	-1.175**
	(0.570)	(0.421)	(0.220)	(0.462)
L.dr	-0.130	-0.173	0.157	-0.497
	(0.367)	(0.271)	(0.142)	(0.299)*
L.ex	-0.144	-0.005	0.023	0.381
	(0.306)	(0.226)	(0.118)	(0.250)
L.π	-0.751**	-0.049	-0.105	0.438*
	(0.317)	(0.234)	(0.122)	(0.258)
Normality Test (Jarque-Bera)				
χ^2	0.965	3.805	0.057	1.509
(Prob> χ^2)	(0.617)	(0.149)	(0.971)	(0.470)
All – Normality		**Autocorrelation**	**- Lag 1 –**	**- Lag 2 –**
χ^2	3.937	χ^2	10.747	13.020
(Prob> χ^2)	(0.137)	(Prob> χ^2)	(0.824)	(0.671)

p<.1; ** p<.05; *** p<.01. All the estimations are made with an unrestricted constant in the model. Autocorrelation tests H^0: no autocorrelation at lag order. As such fail to reject the null hypothesis of no autocorrelation.

The Jarque-Bera method is used to test for normality assumptions. This technique tests the null hypothesis that the data are from a normal distribution where a rejection of the null indicating that the data are not from a normal distribution (Jarque and Bera 1980).[115] In each case, the test fails to reject the null hypothesis that the data are from a normal distribution at a 95 per cent confidence level. Similarly, the tests for residual autocorrelation in each of the equations as well as for the entire model fail to reject the null hypothesis of no autocorrelation.

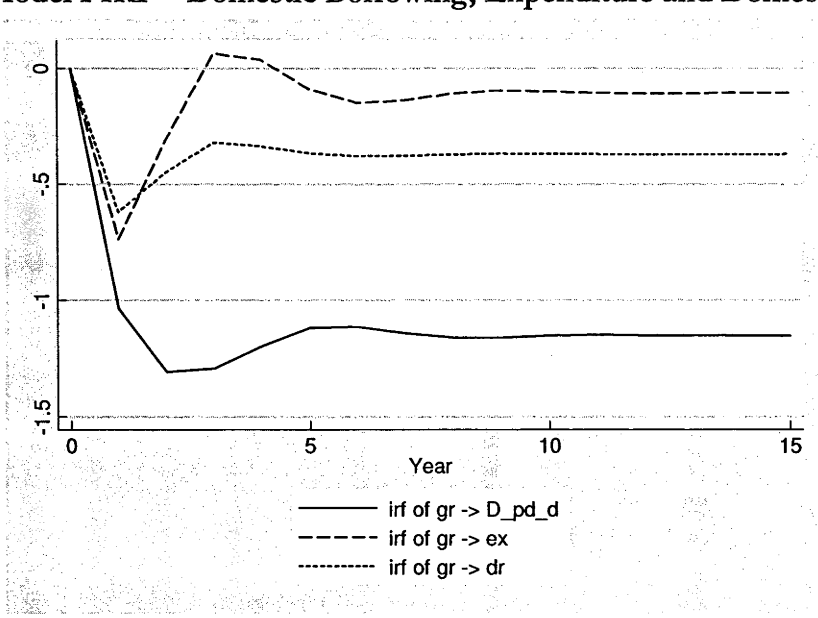
Adjustment to fiscal imbalances have occurred primarily through changes in the expenditure equation, and to a lessor extent domestic financing of public debt. In both these cases the lagged error correction terms, L.π, are significant, whereas the domestic revenue and grant revenue coefficients are insignificant at a 90 per cent confidence level. As discussed, these variables capture the adjustment of the relevant variables towards the long run equilibrium. Hence in this representation, expenditure and domestic borrowing are the key variables which adjust in the short term to correct budgetary imbalances according to Equation (5.3). As shall be discussed, this is an intuitive result, with expenditure and borrowing being the most flexible and easily adjustable fiscal instruments at the government's disposal.

[115] This null hypothesis is a joint hypothesis of the skewness being zero and the excess kurtosis being zero, since samples from a normal distribution have an expected skewness of 0 and an expected excess kurtosis of 0 (which is the same as a kurtosis of 3). The definition shows that any deviation from this increases the value of the Jarque Bera statistic (Jarque and Bera 1980).

A further insight from these results is that the insignificance of the grant aid variable in the domestic revenue equation suggests that grant levels have been relatively unresponsive to changes in domestic revenue collection. This indicates that efforts by the PNG Government to increase donor grant disbursements during periods of fiscal pressure have tended to be either limited or relatively unsuccessful. This result may also reflect the tendency of donors to respond to significant revenue shortfalls with additional donor financed loans rather than grants—which are not captured by the estimations. Some pertinent examples of this being; the $50 million IMF and World Bank led bail out package in 1990 following the fiscal pressures created from the closure of the Bougainville mine in 1989; the Australian backed US$111 loan facility offered to the PNG government in 1994 following a signficiant revenue shortfall; and, the structural adjustment loan made again by the World Bank following the 1999 public debt crises.

Whilst the VECM results estimate the direct impact between each of these variables in practice, there are likely to be important flow-on effects occurring within the budgetary cycle. The total long term impact of an increase in grants is now assessed with the use of the IRF analysis discussed. This approach captures both the direct and indirect effects as well as those attributed to the error correction mechanism.

Chart 5.3: Model I IRF—Domestic Borrowing, Expenditure and Domestic Revenue



Source: Author's calculations.

Chart 5.3 illustrates the impact of an increase in grants on domestic borrowing, expenditure and domestic revenue collection. Here the one standard deviation shock to grants leads in the first instance to a unanimous decline in all three of the response variables. Following

this the effect of the grant impulse continues to have a sustained negative impact on levels of domestic revenue. This suggests that grant aid has acted as a substitute for domestic revenue collection, with a one standard deviation impulse to aid leading to an approximately half sized fall in taxation receipts after 5 years. The negative impact of grants on spending is short lived, with the effect eventually stabilising after approximately five years at a near zero value, after a short positive period. The concurrent negative impact of aid on domestic borrowing however suggests that a large portion of the grant impulse is also allocated towards lowering the public debt burden. In this sense, once all of the knock on effects within the fiscal system have stabilised the shock to grants acts primarily to replace domestic revenue collection and lower public debt levels, rather than augment levels of government expenditure.

Each of these long term relationships are also presented in the cumulative impulse response functions shown in Chart 5.4 (Appendix 5.4) which give the cumulative sum of all of the response values to the given grant aid shock from all previous periods. These results further show the weak impact of aid on total spending and its negative relationship with domestic revenue and domestic borrowing. In terms of domestic revenue this supports the earlier contention that foreign aid may have acted as a significant disincentive for the PNG Government to expand its own domestic revenue sources. Another explanation for these results may also be due to some indirect 'conditionality' effects of aid. As discussed in Chapter 4 aid grants to PNG were routinely made conditional on the implementation of public sector reform and reduced public spending as a means of controlling public debt. Some of the most notable examples of this were the major donor interventions following the 1991, 1994 and 1999 financial crises, which all imposed expenditure reduction targets in the immediate post crisis periods.[116]

5.7 Model II—Fiscal Aggregates and Expenditure Composition

The second model now considers the impact of grant revenues and domestic revenues on the composition of fiscal expenditures between the development and general expenditure categories. The model estimates the following relationships:

[116] Another explanation for this result is that that the provision of donor grants, say in the form of technical assistance, may have contributed to reforms which lowered or removed many trade tariffs, hence lowering overall revenue collection.

$$
\begin{aligned}
\Delta EX\_D_t &= c_{10} + \sum_{k=1}^{r} \alpha_k \psi_{k,t-1} + \sum_{i=1}^{n} \alpha_{1i} \Delta EX\_D_{t-i} + \sum_{i=1}^{n} \alpha_{2i} \Delta Y_{t-i} + \varepsilon_{EX\_D_t} \\
\Delta EX\_G_t &= c_{20} + \sum_{k=1}^{r} \alpha_k \psi_{k,t-1} + \sum_{i=1}^{n} \alpha_{3i} \Delta EX\_O_{t-i} + \sum_{i=1}^{n} \alpha_{4i} \Delta Y_{t-i} + \varepsilon_{EX\_G_t} \\
\Delta GR_t &= c_{30} + \sum_{k=1}^{r} \alpha_k \psi_{k,t-1} + \sum_{i=1}^{n} \alpha_{5i} \Delta GR_{t-i} + \sum_{i=1}^{n} \alpha_{6i} \Delta Y_{t-i} + \varepsilon_{GR_t} \\
\Delta DR_t &= c_{40} + \sum_{k=1}^{r} \alpha_k \psi_{k,t-1} + \sum_{i=1}^{n} \alpha_{7i} \Delta DR_{t-i} + \sum_{i=1}^{n} \alpha_{8i} \Delta Y_{t-i} + \varepsilon_{DR_t} \\
\Delta D.PD\_d_t &= c_{50} + \sum_{k=1}^{r} \alpha_k \psi_{k,t-1} + \sum_{i=1}^{n} \alpha_{9i} \Delta D.PD\_d_{t-i} + \sum_{i=1}^{n} \alpha_{10i} \Delta Y_{t-i} + \varepsilon_{D.PD\_d_t}
\end{aligned}
\tag{5.4}
$$

where EX_D_t is the development expenditures category, EX_G_t is the general expenditure category, DR_t is domestic revenue collection, GR_t is grant revenue and $D.PD\_d_t$ is domestic borrowing. Again, Y_{t-i} simply equals the vector of the other four non dependent variables and $\psi_{k,t-1}$ represents the cointegrating equation residuals so that the α_k terms represent the adjustment coefficients. As usual, each of the error terms is assumed to have the normal white noise characteristics.

The AIC and HQIC again suggest that the model should again be estimated with two lags (Table 5.7, Appendix 5.3), whilst the Johansen procedure rejects the null hypothesis of no cointegrating vectors but fails to reject the null hypothesis of one cointegrating vector (Table 5.8, Appendix 5.3). The cointegrating relationships amongst the variables after again being normalised on domestic borrowing within the VECM framework are defined in Table 5.9.

Table 5.9: Cointegrating Relationships for Model II

Normalised on Domestic Borrowing	Coefficients
D.pd_d	1
gr	1.310***
	(0.335)
dr	0.609
	(0.206)***
ex_d	-1.107***
	(0.244)
ex_g	-0.508*
	(0.270)

Standard errors in parenthesis. * p<.1; ** p<.05; *** p<.01. Johansen normalization restriction imposed on public debt.

The results support those obtained for the cointegrating relationships in Model I. Both grant and domestic revenues have a highly significant negative association with long run levels of domestic borrowing, whilst both of the expenditure variables have a highly significant positive impact on long run levels of domestic borrowing. In short, over the

long term more fiscal resources have led to lower levels of debt accumulation whilst higher levels of spending have had a positive relationship with debt levels.

The short run VECM coefficients are now presented in Table 5.10. The results again show that expenditure levels have been a key adjustment mechanism to imbalances in the fiscal system. Of the two expenditure categories however, those related to development activities have been the major source of these adjustments.

As in the previous model, the adjustment parameter in the domestic borrowing equation is again significant and positively signed. This suggests that the PNG Government has tended to favour varying levels of public debt in order to adjust to short term fiscal imbalances. The implication here is that government has found it easier, or has been more willing, to incur variations in levels of domestic debt than it has for each of the other fiscal aggregates. This may have occurred for example by absorbing shortfalls in domestic revenue collection by increasing the deficit rather than reining in expenditure levels.

Table 5.10: VECM Results for Model II

	1/ D_gr	2/ D2_pd_d	3/ D2_dr	4/ D_ex_d	5/ D_ex_g
L.D.pd_d	0.053	0.046	-0.135	-0.009	-0.188
	(0.078)	(0.199)	(0.152)	(0.088)	(0.133)
L.gr	0.223	0.023	-0.539	-0.220	-0.658*
	(0.235)	(0.601)	(0.459)	(0.267)	(0.400)
L.dr	0.162	-0.064	-0.269	0.027	0.614
	(0.145)	(0.372)	(0.284)	(0.165)	(0.248)**
L.ex_g	0.112	0.130	0.125	0.073	0.452**
	(0.131)	(0.336)	(0.257)	(0.149)	(0.224)
L.ex_d	-0.192	-0.690	-0.187	-0.119	0.014
	(0.204)	(0.523)	(0.399)	(0.232)	(0.349)
L.π	0.0358	0.251**	-0.046	-0.059	0.099
	(0.040)	(0.103)	(0.079)	(0.046)	(0.069)
Normality Test (Jarque-Bera)					
χ^2	1.712	0.167	2.133	2.004	2.897
(Prob> χ^2)	(0.424)	(0.920)	(0.344)	(0.367)	(0.234)
All – Normality		**Autocorrelation**	**- Lag 1 –**	**- Lag 2 –**	
χ^2	8.913	χ^2	28.882	25.746	
(Prob> χ^2)	(0.540)	(Prob> χ^2)	(0.268)	(0.421)	

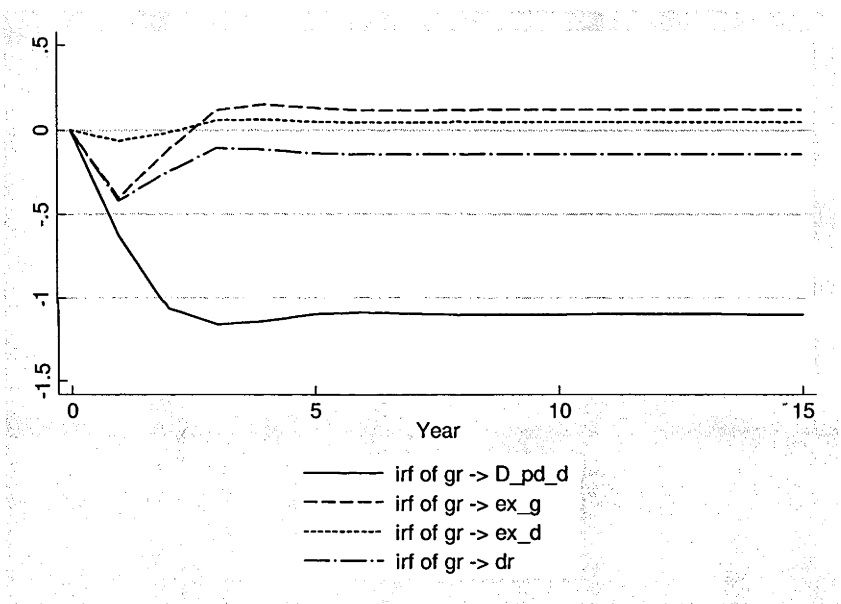
p<.1; ** p<.05; *** p<.01. All the estimations are made with an unrestricted constant in the model. Autocorrelation tests H^0: no autocorrelation at lag order. As such fail to reject the null hypothesis of no autocorrelation.

These results support Chapter 4's historical analysis which illustrated the government's reluctance to reign in expenditures even during period with substantially lower revenue. An example of this was in the early 1990's when the closure of the Bougainville mining

operations left a large hole in domestic revenue collection. Rather than cutting expenditures during this period to adjust to the fiscal imbalance, development expenditures remained relatively constant and the general expenditure category increased. Given the relatively constant grant revenue sources this period thus also saw a surge in public debt levels—illustrating a broader PNG Government tendency to use borrowing as a 'shock absorber' to imbalances in the fiscal situation.

Each of the long term relationships between the fiscal and aid variables are now again shown with the use of generalised and cumulative IRFs which illustrate the full knock-on effects of an aid impulse. Chart 5.5 shows the impact of a one standard deviation shock to grant revenue on domestic revenue, public debt and both expenditure categories, whilst Chart 5.6 (Appendix 5.4) illustrates the cumulative version of the IRF.

Chart 5.5: Model II IRF—Domestic Revenue, Domestic Borrowing and Government Expenditure



Source: Author's calculations.

The results for domestic borrowing and domestic revenue are comparatively similar to those established within Model I. A one standard deviation shock to grant aid leads to a decline both in levels of domestic borrowing and in domestic revenue mobilisation. Again, this suggests that while a portion of aid is treated as a substitute for further government borrowing that it has also encouraged the PNG Government to place a lower tax burden on its domestic constituents.

Both the general and development expenditure variables also follow a similar time path to that shown for total expenditure in Model I with an initial small decline followed by an

eventually stabilisation at approximately zero. In this case however, both the variables are slightly positive although this effect is too small to be deemed significant in the absence of reliable confidence intervals.

Also of note is the larger initial decrease in the general expenditure category than the development expenditure category, suggesting that in the short term at least the provision of foreign grants helps to improve the composition of PNG Government expenditures towards key development items. The cumulative IRF shown in Chart 5.6 (Appendix 5.4) illustrates however that this impact is eroded over time with a return to the original expenditure composition after approximately seven years.

One of the most plausible explanations for these results is that initially, aid is effective at improving the composition of government expenditures towards key development sectors. Conditionality and incentive effects help to constrain general expenditures whilst a large portion or project and program aid sticks to the development category. Then, over time, the recipient bureaucracy incorporates these additional financial flows into its budgetary decision-making process. Following this, a reallocation of domestic funds occurs which leads to an expenditure composition comparable to what existed prior to the aid inflow. In essence, donor attempts to improve the composition of PNG expenditures are successful in the short but not the long term.

5.8 Model III—Fiscal Aggregates, Expenditure Composition and Aid Modalities

The third model now separates the grant aid variable into two components—budgetary support and project or program aid to determine whether these components have had differential impacts on the contribution of grant aid to each of these fiscal relationships. The final model estimates a six endogenous variable system consisting of the following relationships:

$$
\begin{aligned}
\Delta EX\_D_t &= c_{10} + \sum_{k=1}^{r} \alpha_k \psi_{k,t-1} + \sum_{i=1}^{n} \alpha_{1i} \Delta EX\_D_{t-i} + \sum_{i=1}^{n} \alpha_{2i} \Delta Y_{t-i} + \varepsilon_{EX\_D_t} \\
\Delta EX\_G_t &= c_{20} + \sum_{k=1}^{r} \alpha_k \psi_{k,t-1} + \sum_{i=1}^{n} \alpha_{3i} \Delta EX\_G_{t-i} + \sum_{i=1}^{n} \alpha_{4i} \Delta Y_{t-i} + \varepsilon_{EX\_G_t} \\
\Delta DR_t &= c_{30} + \sum_{k=1}^{r} \alpha_k \psi_{k,t-1} + \sum_{i=1}^{n} \alpha_{5i} \Delta DR_{t-i} + \sum_{i=1}^{n} \alpha_{6i} \Delta Y_{t-i} + \varepsilon_{DR_t} \\
\Delta GR\_BS_t &= c_{40} + \sum_{k=1}^{r} \alpha_k \psi_{k,t-1} + \sum_{i=1}^{n} \alpha_{7i} \Delta GR\_BS_{t-i} + \sum_{i=1}^{n} \alpha_{8i} \Delta Y_{t-i} + \varepsilon_{GR\_BS_t} \\
\Delta GR\_PR_t &= c_{50} + \sum_{k=1}^{r} \alpha_k \psi_{k,t-1} + \sum_{i=1}^{n} \alpha_{9i} \Delta GR\_PR_{t-i} + \sum_{i=1}^{n} \alpha_{10i} \Delta Y_{t-i} + \varepsilon_{GR\_PR_t} \\
\Delta D.PD\_d_t &= c_{60} + \sum_{k=1}^{r} \alpha_k \psi_{k,t-1} + \sum_{i=1}^{n} \alpha_{11i} \Delta D.PD\_d_{t-i} + \sum_{i=1}^{n} \alpha_{12i} \Delta Y_{t-i} + \varepsilon_{D.PD\_d_t}
\end{aligned}
\tag{5.5}
$$

where EX_D_t is the development expenditures category, EX_G_t is the general expenditures category, DR_t is domestic revenue collection, $D.PD\_d_t$ is domestic borrowing, GR_BS_t is grant revenue given in the form of budget support and GR_PR_t is grant revenue given in the form of project and program aid. All other variables are as defined previously.

The HQIC criteria suggests that the model should be estimated with only a one year lag structure, whilst the AIC suggests that it should be estimated with a three year lag (Table 5.11, Appendix 5.3). The decision is made to use the one year lag structure both to preserve degrees of freedom within what is potentially an over-paramatised model, given the six explanatory variables. This decision was also made on the basis that the one lag model produces a trace test statistic supporting one cointegrating relationship amongst the variables (Table 5.12, Appendix 5.3), whilst the three lag model suggests that there are three.[117] Nevertheless, without any base results to compare them to, the impacts of budget support vis-à-vis project and program aid on each of these fiscal variables should still be taken as preliminary rather than conclusive.

[117] This provides some evidence that the three lag model adds to the problems of inconsistency in results when VECM models suffer from over-paramatisation.

Table 5.13: Cointegrating Relationships for Model III

1/Normalised on Domestic Borrowing	Coefficients
D.pd_d	1
gr_bs	2.546***
	(0.843)
gr_pr	-1.353
	(1.009)
dr	1.902***
	(0.560)
ex_d	-3.364***
	(0.811)
ex_g	-0.515
	(0.606)

Standard errors in parenthesis. * p<.1; ** p<.05; *** p<.01. Johansen normalisation restriction imposed.

The cointegrating relationship is again normalised on domestic borrowing. In this case, disaggregating the grant aid variable suggests the budget support component has been the major contributor to reduced levels of domestic borrowing, with the project aid variable recording an insignificant long run cointegrating coefficient. Both expenditure categories also again both have negative coefficient estimates, supporting the results of the previous two models that higher levels of spending have a positive relationship with domestic borrowing. Also in line with the previous two models, higher levels of domestic revenue have a negative relationship with debt levels. This indicates that increases in domestic resources are not entirely allocated to higher levels of expenditures, but rather to also lower domestic borrowing. Table 5.14 presents the VECM coefficients to analyse the short run dynamics of the model.

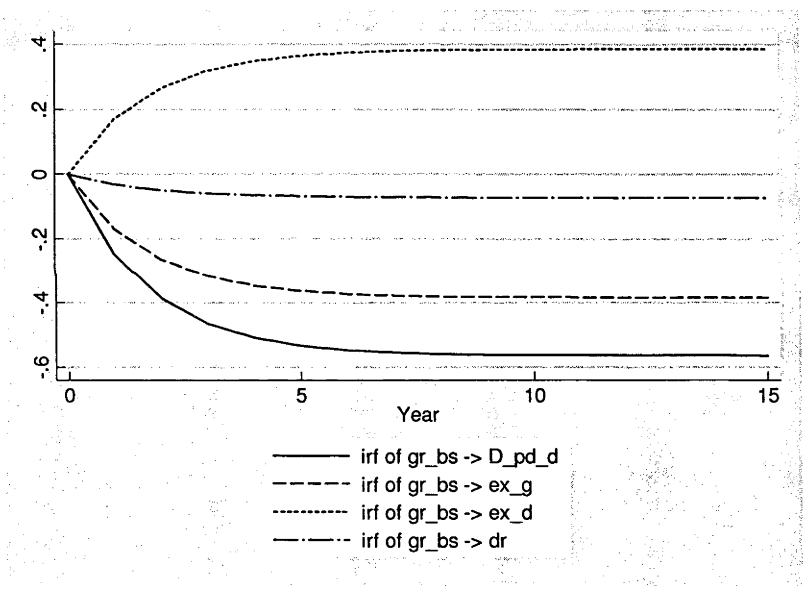
Table 5.14: VECM Results for Model III

	1/D_dr	2/D_gr_bs	3/D_gr_pr	4/ D2_pd_d	5/D_ex_d	6/D_ex_g
L._ce1	-0.012	-0.027**	0.044**	-0.097	0.067***	-0.066
	(0.047)	(0.013)	(0.020)	(0.067)	(0.025)	(0.043)
Normality Test (Jarque-Bera)						
Chi-2	0.692	2.825	1.191	1.250	0.677	0.117
(Prob>Chi2)	(0.707)	(0.243)	(0.551)	(0.535)	(0.712)	(0.943)
All – Normality		**Autocorrelation**	**- Lag 1 –**	**- Lag 2 –**		
Chi-2	6.753	Chi-2	34.343	37.930		
(Prob>Chi2)	(0.873)	(Prob>Chi-2)	(0.547)	(0.381)		

*p<.1; ** p<.05; *** p<.01. Autocorrelation tests H^0: no autocorrelation at chosen lag order. As such fail to reject the null hypothesis of no autocorrelation.

Given the model is estimated with one lag, only the error correction terms are presented. These coefficients once more reveal that expenditure has been a key adjustment mechanism within this system of fiscal equations. It also appears that the majority of this expenditure adjustment has occurred through the development expenditure variable with it recording a highly significant positive coefficient estimate whilst the general expenditure variable is insignificant. In addition, with the disaggregation of aid flows, the estimation results show that both project aid and budgetary support have responded to short term imbalances in PNG's fiscal position. For instance, this may occur when shortfalls in domestic revenue and looming public debt crisis are met with injections of additional donor assistance. Chart 5.7 now shows the impact of a one standard deviation shock to budgetary support on each of the fiscal variables.

Chart 5.7: Model III IRF—Impact of Budgetary Support on Domestic Revenue, Domestic Borrowing and Government Expenditure

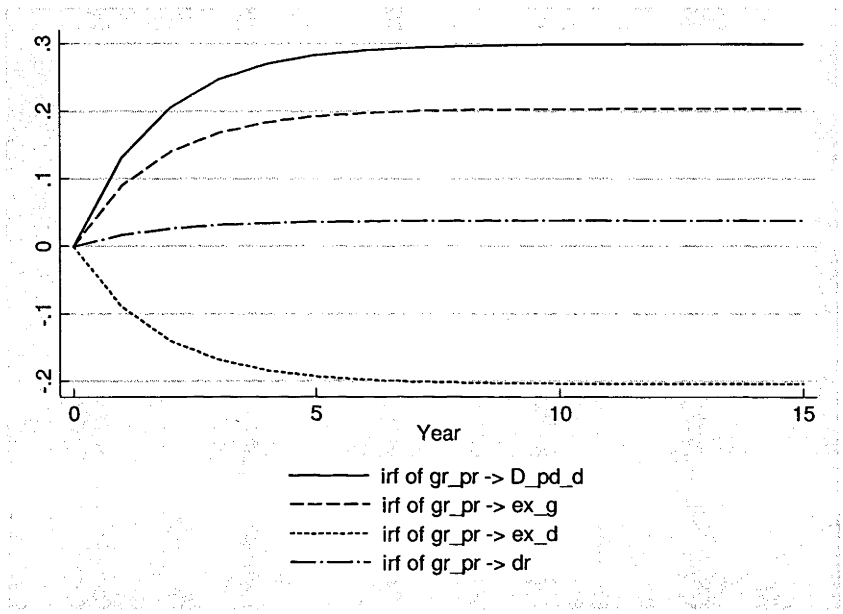


Source: Author's calculations.

As in the previous two models, the shock to foreign grants (in this case through budgetary support) has an unambiguous negative relationship with levels of domestic borrowing. In this case however, rather than eroding tax collection budget support is shown to have an almost benign impact on levels of domestic revenue. Budget support also has a significant impact on improving the composition of government spending by increasing the proportion of funds going to key development sectors whilst reducing the amount of spending in the general expenditure category. This will be discussed in more detail shortly.

Chart 5.8 shows the impact of a one standard deviation shock to grant revenues in the form of project and program aid on each of the fiscal variables. In contrast to budgetary support, project and program aid have encouraged higher levels of spending in the general but not development expenditure category. In fact, the aid impulse has an almost insignificant impact on the amount of government funds allocated to key development activities. Also in contrast to budgetary support, the project aid impulse raises levels of domestic borrowing, with the effect stabilising after approximately seven years, with a close to zero long run impact on domestic revenue collection.

Chart 5.8: Model III IRF—Impact of Project and Program Aid on Domestic Revenue, Domestic Borrowing and Government Expenditure



Source: Author's calculations.

One explanation for this is that earmarked aid modalities have encouraged the PNG Government to undertake more than proportional resource allocations away from donor financed development sectors and towards general government consumption expenditure. This may be a result of the effect described previously as 'aid illusion' (McGillivray and Morrissey 2000). This is the situation within which with imperfect information flows and weak expenditure management systems aid inflows can be accompanied with misperceptions or 'illusions' regarding either the real or nominal value of the aid inflow, and the spending conditions attached (McGillivray and Morrissey 2000:3). In the case of PNG for example, weak budgetary processes may overvalue the contribution of aid to a specific project. As a result, the presence of increased donor activity within a sector may encourage the PNG Government to concentrate more of its own resources elsewhere. Higher levels of expenditure for general consumption activities may then subsequently

drive the need to increase the government's recourse to domestic borrowing to fund its deficit financing.

Another explanation for this effect is that the large increase in project and program aid during the 1990s coincided with the deteriorating fiscal discipline of government and a rapid build up in public debt. Furthermore, as discussed in Chapter 4 one of the most significant peak increases in project and program aid, following the Bougainville crisis in 1989–90, occurred during a period when the government was rapidly withdrawing resources from development sectors of the economy and allocating them towards conflict related expenditure. This led to a situation whereby despite increasing total expenditure and an increasing effort from donors to earmark their assistance to specific activities, resources for key development sectors such as health and infrastructure remained stagnant and for education even fell. This eroded any potentially positive impact this shift in aid policy may have had on improving the composition of PNG Government expenditures.

5.9 Discussion and Conclusion

This chapter has sought to assess the impact of foreign grant aid on the fiscal behaviour of the PNG Government since independence. The study has been motivated by a need to increase donor understanding of how foreign financial assistance interacts with public sector behaviour to influence aggregate fiscal outcomes. Understanding the complex web of interactions between foreign aid and the management of fiscal aggregates can thus serve as a key tool in enhancing the effectiveness of foreign assistance which PNG receives.

The analysis drew upon the VECM approach to estimate these relationships which was found to be appropriate with the use of Granger's representation theorem and the non stationary nature of the data. This approach has also offered a number of advantages over traditional FRMs which have had difficulties in determining appropriate target variables and which are limited in their ability to consider long run dynamics. This is the first study to apply these methods to PNG with an extensive data collection exercise, allowing for an analysis of the relationships between grant aid, domestic borrowing, domestic revenue and development expenditure allocations. This is also the first such study to use this approach to consider the potentially divergent impact of budget support grants vis-à-vis project aid grants on the fiscal behaviour of government. In doing this, a number of important results are found with a summary provided in Appendix 5.5.

Firstly, there is consistent evidence that expenditure and domestic debt have acted as key shock absorbers within the PNG fiscal system, whereas domestic revenue collection and grant aid have tended to be independent of the prevailing fiscal situation. In particular, the PNG Government appears to have been most willing to adjust levels of expenditure in a number of key development sectors in response to fiscal imbalances. This suggests for example that during periods of expenditure contraction, the PNG Government has tended to give less priority to what has been termed development related expenditure, whilst maintaining those classified in the general category.

Secondly, aid has had an unambiguous negative effect on the accumulation of additional domestic debt. A positive shock to grant aid lowers domestic borrowing in both the short and long term. This suggests that foreign grants have acted as an important substitute to government borrowing across the post independence period.

Grant aid has however also been associated with lower long term levels of domestic revenue mobilisation. As a result of this Government preference for using aid grants to substitute for borrowing and to replace domestic revenue collection, the net effect of aid grants on aggregate expenditure levels was close to zero. To an extent, this result supports the contention of the many critics of aid to PNG who have argued that aid has undermined the government's incentive to tax domestic constituents or to create a more vibrant private sector which can serve as a revenue base for government expenditure.

Preliminary evidence was also presented to suggest that these effects have varied considerably across different types of grant aid delivery. Budget support in particular has a strong relationship with the lower domestic revenue and lower domestic borrowing effects, although it also supports higher rates of expenditure in the development expenditures category. In addition to the grant inflow, this was financed from budget support's impact on lowering the proportion of funds being allocated to general government spending items. Project aid on the other hand has a strong positive relationship with higher rates of general government expenditure which also corresponds with a positive impact on domestic borrowing and revenue levels, although both of these are comparatively small.

These results add further insights into a number of the contentions discussed at the beginning of this chapter. The accusation that grant aid, and in particular budget support, has undermined the PNG Government's incentive to expand its own tax collection appears well founded. Higher levels of grants are strongly associated with lower levels of domestic

revenue mobilisation, reflecting a preference by the PNG Government to continue drawing on foreign resources rather than tax its own constituents. The claim that grants have supported higher overall levels of unproductive government expenditure are however, not supported by the data. The PNG Government has displayed a clear preference for using additional grant resources to lower its levels of domestic borrowing rather than funding new expenditure items.

There are some caveats worth noting about the reliability and usefulness of these results. As discussed, the VECM approach has a number of limitations including the potential to over parameterise the model which can lead to sensitive results in terms of lag length. This is particularly the case for Model III, which included six endogenous variables each interacting contemporaneously and with one lag for a 35-year sample. This level of disaggregation in both the expenditure and aid variables may place an excessive burden on the explanatory power of the data. It is for this reason that these results are referred to as preliminary. Nevertheless, the consistency of the results across all three specifications adds a degree of confidence to the core findings of this chapter.

The results reveal that there is much scope for foreign financial resources to be managed more effectively by both donors and the PNG Government. PNG's continued narrow tax base adds significance to the tendency of grant aid to lower the government's domestic revenue collection efforts—potentially highlighting that priority should be placed on supporting taxation collection in addition to the current focus on improving the quality and composition of expenditure. The preference for using grant inflows to lower domestic borrowing requirements rather than spending also highlights the impact of aid on increasing aggregate availability of resources depends first and foremost on the behaviour of the PNG Government, not on the priorities of donors.

Delivering aid which increases, rather than replaces, the availability of resources in key development sectors is also a key area of concern. Australia's renewed focus on supporting an expansion of basic service delivery necessitates a renewed need to engage in a productive dialogue with the PNG Government surrounding their development objectives and where donor funds can be used to support these targets. In the absence of real cooperation foreign aid is likely to continue having a limited impact on financing development outcomes in PNG. The practicality of addressing these issues shall be discussed in the final policy implications section in Chapter 8.

Finally, it is important to note that this analysis has not determined to what extent aid allocated to specific activities has remained within its respective sectors. Making these types of estimates within the current framework would be problematic, given the large number of aid and fiscal variables required to analyse these inter sectoral effects of aid. In fact, when preliminary estimates were carried out with disaggregated expenditures, the model failed standard stability tests and produced nonsensical parameter estimates. In order to assess the inter sectoral fungibility of PNG aid, a new model is developed which incorporates a static Seemingly Unrelated Regression (SUR) estimation technique. This technique has the disadvantage of ignoring the dynamic properties of these fiscal relationships but imposes a much lower burden on the degrees of freedom available in the estimation of the model. This is the subject of Chapter 6.

Chapter 6: Foreign Aid and Sectoral Expenditures in PNG

6.1 Introduction

PNG's continued slow rates of progress towards achieving key social welfare targets such as the MDGs reflects poor rates of access by large portions of the population to essential public services such as health, education and national infrastructure networks. Helping the PNG Government to improve access to these basic services is thus a central challenge for PNG's major bilateral and multilateral donor partners, particular as they increasingly focus their efforts towards MDG targets.

The previous chapter sought to analyse how foreign financial assistance has influenced the aggregate availability of government resources which are utilised to achieve these outcomes. This analysis showed that at the aggregate level it was the PNG Government's response to the aid inflow, rather than donor priorities, that determined its overall impact on financing additional spending on pro-development activities. In particular it highlighted that large portions of foreign aid had been highly fungible, with a weak overall impact on improving the amount of resources made available to pay for key social service delivery items within the PNG budget. This analysis was, however, limited in its ability to consider how foreign aid had influenced sectoral expenditure levels by not accounting for the proportion of aid which has actually been delivered to those sectors.

Government decisions about how much it will let donor-funded resources augment its own expenditure allocations and how much it will treat these resources as fungible will play a key role in the ability of aid to help finance improved progress towards welfare targets such as the MDGs. Indeed, as discussed in Chapter 4, one of the key justifications of the switch between budgetary support and project aid was that not enough donor resources were being allocated to pro development activities. However, despite these changing aid modalities, it was also shown that expenditure levels in a number of key development sectors have continued to deteriorate. The most dramatic of those has been in education, where total funding levels have fallen from K135 per capita in 1990 to less than K40 per capita in 2007. Likewise, health spending has fallen from K50 per capita in 1990 to just under K40 per capita in 2006, while infrastructure spending dropped from K45 per capita in 1990 to almost K10 per capita in 2001, although it has subsequently recovered to 1990 levels.

This chapter seeks to build on the analysis of Chapter 5 by addressing two additional questions. Firstly, what impact has foreign aid had on total funding levels for three core service delivery priorities—health, education and infrastructure—in relation to the funding of general government consumption expenditure? Secondly, to what extent has the shift from general budgetary support to earmarked aid modalities such as project and program aid improved the amount of funding being provided to these three key service delivery sectors?

Calculations of fungibility parameters in PNG are complicated by the fact that between 1975 and 2008 it has received approximately 57 per cent of its foreign assistance in the form of direct budgetary support. As such, this chapter extends the literature by calculating three different sets of parameters to measure the impact of foreign aid on sectoral expenditure levels. The first measures the extent to which project and program aid has augmented or replaced PNG Government funding to that sector. The second measures the degree to which budget support also increased funding to these sectors vis-à-vis other budgetary responses and the third combines the first two sets of parameters to measure the aggregate impact of a dollar increase in foreign aid allocated at its mean historical values across these two types of aid delivery.

A number of authors have outlined their opposition to the focus on the existence of inter sectoral fungibility as a means of assessing the effectiveness of foreign aid (White 1998; Holmqvist 2000; McGillivray and Morrissey 2000; McGillivray and Morrissey 2001a; McGillivray and Morrissey 2001b). These authors highlight that from a theoretical standpoint there is little a priori reason to believe that fungible aid will be any less effective than non fungible aid. Indeed, all that is required in order for fungibility to exist is a simple difference in the expenditure priorities between donor and recipient. This issue was analysed by Peterson (2007) who showed that despite an average of 65 per cent of sectoral aid being spent outside of its intended sector, there was no evidence that non fungible aid works better at encouraging growth than fungible aid (Peterson 2007:1081).

This is an important point and it should be noted at the outset that this chapter does not seek to judge the effectiveness of aid flows in PNG on the basis of fungibility, nor would the existence of fungibility constitute a justification for a reduction of aid flows. Rather, this chapter uses the categorical fungibility framework to analyse both the impact of aid on sectoral expenditure levels and on the ability of earmarked aid vis-à-vis budgetary support to induce higher expenditure in priority development sectors of the PNG economy.

Understanding how these two competing forms of aid delivery influence sectoral spending outcomes can offer some important insights into the design of future aid modalities.

6.2 Literature Review

The categorical fungibility literature is concerned specifically with how aid funds have influenced the total availability of resources within sectors of the recipient economy. In particular it seeks to determine to what extent the recipient government has altered its own sectoral expenditure in response to foreign resource inflows. Two approaches have been taken to measuring this sectoral fungibility.

6.2.1 Utility Maximisation Studies

The first approach to measuring the sectoral fungibility of aid derives a set of simultaneous linear expenditure equations from a recipient government that, it is assumed, maximises its utility function by distributing resources across each sector of the economy. Using this approach, Khilji and Zampelli (1991) find that in the case of Pakistan aid has indeed been highly fungible. However, instead of financing unproductive expenditure types the majority of freed up resources are transferred to lower the tax burden on domestic constituents.[118] Studying the effects of foreign aid on intergovernmental financing in India, Swaroop et al. (2000) find that foreign aid simply acted as a substitute for spending that the government would have undertaken anyway–with freed up funds almost entirely reallocated to non-development activities such as defence and public administration. Feyzioglu et al. (1998) then consider a panel of 38 aid recipients for the period 1970–90 and find that for three of the five sectors examined foreign aid has led to insignificant increases in funding for those sectors.

One criticism of the method adopted in papers such as Feyzioglu et al. (1998) is that because individual recipient bureaucracies respond in vastly different ways to aid inflow, a panel data approach is likely to aggregate important heterogenous impacts of aid, resulting in a loss of important information. Another criticism of papers such as those by Feyzioglu et al. (1998) and Swaroop et al. (2000) relates to the utility specification which they adopt for government preferences. Their approach distinguishes between two types of expenditure—those to which aid is allocated and others which receive no aid. Authors such as McGillivray and Morrissey (2000a:421) have argued that this assumption is acceptable only if there is reason to believe that these two types of expenditure can be separated

[118] Khilji and Zampelli (1994) also find that aid flows had been highly fungible with a large portion of the assistance being used to finance higher levels of private sector consumption and allowing the government to lower aggregate tax collection efforts.

within the government's utility function such that aid funds can only affect government consumption decisions through the fungible portion of aid. Indeed, as Feyzioglu et al. (1998:34) highlight, this requires that 'aid affects the government's choice [over all public goods] only through the fungible portion; public goods purchased from the non fungible part do not affect this choice'. Given the inter related nature of all these expenditures, however, there is little reason for this to be the case. In fact, one of the central features of categorical fungibility highlights that if aid funding of one sector increases, then the fungible portion of that aid allows government to increase all other expenditures.

6.2.2 Community Indifference Curve Studies

The second method of calculating categorical fungibility also focuses on estimating a system of interdependent fiscal equations following an inflow of aid. In this case, however, government choices are made via indifference curves which express preferences for combinations of expenditure, subject to budget constraints which include both domestic revenues plus foreign aid (Pack and Pack 1993:259). While this approach is more ad hoc than the previous, it does have the advantage of allowing the impact of aid receipts to affect government expenditure allocations across all areas of the budget, both aid-receiving and non aid-receiving. As shall be explained, this approach also has the added advantage that it can help distinguish between types of aid which are allocated to specific sectors (project and program aid) and those which simply augment general government revenue (budgetary support). For these reasons this chapter adopts this approach.

Pack and Pack (1990) provide one of the earliest examples of this literature. The authors estimate the impact of aid inflows on a number of development and non development (current) expenditures for Indonesia between 1966 and 1986. They find that aid has tended to increase development expenditures, with funds remaining within those sectors for which they were intended. Additionally, they find that aid has tended to stimulate rather than reduce domestic revenue collection, alleviating concerns about the ability of aid to undermine the government's incentive to tax domestic constituents. Cashel-Cordo and Craig (1990) study a panel of 46 countries between 1975 and 1980 to determine what impact total aid flows have had on the size and composition of government expenditure by focusing on expenditure categories which distinguish between defence and non defence spending. They find that, in general, aid has had a stimulatory effect on public spending but that little to none of this has spilt over into the defence budget.

Pack and Pack (1993) follow a similar method to their earlier paper in analysing the affect of aid on the Dominican Republic between 1968 and 1986. In contrast to the findings of their earlier paper, the authors find that the receipt of aid by recipients had been followed by major shifts in allocation from development expenditures to deficit reduction, debt service and, to a lesser extent, own-source revenue reduction.[119] This shift in allocation, they conclude, has dramatically thwarted donors' attempts to increase funding levels to key development sectors of the economy which the authors say may also be why cross-country analyses have found that aid contributes little to GDP growth (Pack and Pack 1993:264). Likewise, Van de Sjipe (2004:30) finds that after controlling for both on and off-budget aid flows for a panel of 105 countries between 1990 and 2003, education aid has had no discernible effect on education spending, while the effect of health aid on public health spending has been much smaller than the additional aid resources.

Tiwara (2007) then replicates the model developed in Pack and Pack (1990) to study the effects of aid fungibility in Nepal between 1976 and 2001. The author finds that aid intended for a particular sector has, by and large, been spent within that sector and, in some cases, has induced the government to augment its spending. Tiwara (2007) proposes that this corroborates the evidence on the flypaper effect of aid not just at the aggregate level but also at the sectoral level. The author also finds that aid has enhanced the government's revenue effort but not to the extent that would enable the government to self finance the inflating government consumption.

6.2.3 Research Gap

Various degrees of fungibility exist within sector-allocated aid delivery and these effects vary considerably at the country level. Given the diversity of institutional, economic and political circumstances in developing countries, this is intuitively appealing. Public sector bureaucracies operate in vastly different ways and are thus likely to respond to aid flows in a heterogeneous manner. Applying these methods to a case study of PNG will thus generate important insights into how aid interacts with public sector behaviour to influence sectoral expenditure outcomes.

One limitation of the previous community indifference curve studies has been its treatment of what are termed 'residual' aid flows. The approach taken in all of these studies has been

[119] Notably, the authors do find some evidence of the flypaper effect in the agriculture, public works and social services sectors. However, this effect did not appear to translate into more than proportional increases in government expenditures at the aggregate level (Pack and Pack 1993:264).

to select a number of sectors, *i*, for which fungibility is a concern (typically pro poor expenditure sectors such as health and education). All the residual, non *i*th sector expenditures are then placed into an 'other' or 'general' expenditure category. Likewise, aid flows are then classified on a similar sectoral basis such that all non *i*th sector aid flows are also included in a 'general' aid category. However, the assumption here is that project and program aid intended for other sectors not included in *i*, and other forms of aid delivery, such as non earmarked budget support, are treated equally by the government in its decisions over inter sectoral transfers. The weakness with this assumption is that project and program aid not included in any of the *i*-sectors has still been allocated to a specific activity whereas aid delivered through budgetary support has simply augmented domestic revenue collection.

As outlined previously in Equation (4.4), this means that budgetary support will be allocated entirely on the basis of government preferences whilst the portion of the residual project aid which is transferred will depend upon the degree to which the recipient government perceives it to be fungible. Given this, the inclusion of budgetary support in the residual project and program aid variable is likely to lead to an over estimate of the amount of fungibility taking place from these residual aid allocations. This issue is particularly important in the case of PNG which has received approximately 57 per cent of its total foreign assistance in the form of budgetary support in the post independence era.

In its analysis of PNG, this chapter extends the literature by considering a model which allows for divergent impacts between each of these different types of aid delivery. In addition to reducing the potential for an upward bias of fungibility estimates, this model also facilitates a comparison of the impact of budgetary support and project/program aid on key development sectors of government spending.

6.3 The Model

The basic model to be estimated builds on Peterson (2007) and Pack and Pack's (1990; 1993) model, to which is added the disaggregation of foreign grants into project aid and budgetary support. This creates a number of differences in the fungibility calculations which are discussed in the text. This chapter also focuses on three categorical expenditure items—health, education and infrastructure. The decision to consider these three sectors was made on the basis of data availability and on the basis of the prominent role that each

sector plays in PNG's ability to achieve a large number of its MDG targets.[120] All remaining project and program aid flows and expenditure are included in a general expenditure/aid category.[121] From Equation (4.11) the basic model to be estimated then consists of a system of interdependent fiscal relationships of the form:

$$ED_{i,t} = f(gdp_t, AD_{i,t}, AO_{i,t}, BS_t) \tag{6.1}$$

$$EG_t = f(gdp_t, AG_t, AO_{G,t}, BS_t) \tag{6.2}$$

$$REV_t = f(gdp_t, A_t, BS_t) \tag{6.3}$$

where $ED_{i,t}$ is government expenditure on development sector i at time t. $AD_{i,t}$ is project aid allocations made to development sector i at time t. $AO_{i,t}$ is the remaining project aid allocations made to all development sectors other than sector i at time t. EG_t is general government expenditure made to all other non development sectors at time t. $AO_{G,t}$ is aid allocations not made to the general category at time t. A_t is total project aid allocations to all sectors which is equal to $\sum_i AD_{i,t} + AG_t$. BS_t is non sector or activity specific budget support grants at time t and REV_t is domestically generated revenue. Because of the static nature of the estimation process and the need for consistency with the literature, the fiscal system also includes a measure of GDP per capita, gdp_t, to control for the impact of the economic environment on spending and revenue levels. All variables are measured in per capita natural logarithms in constant 1999 prices.

As described in Chapter 4, the Bougainville crisis was a traumatic episode for the political, economic and fiscal management of PNG. To control for this event and to determine whether it has had any structural effect on the expenditure and revenue management of the PNG economy, a dummy variable (dum) is also included in the estimations. This variable takes the value of zero for 1974–88 and one for 1989–2006. This leads to the estimation of the following system of equations:

---

[120] For example, four of the eight MDGs are primarily concerned with health and education. These include MDG2: Achieve universal primary education; MDG4: Reduce child mortality; MDG5: Improve maternal health; and MDG6: Combat HIV/AIDS, malaria, and other diseases.

[121] A desire to preserve degrees of freedom within the model also prevented a more detailed analysis of within-sector fungibility to complement the cross sector fungibility results.

$$\ln EE_t = \beta_{0,EE} + \beta_{1,EE} \ln GDP_t + \beta_{2,EE} \ln AE_t + \beta_{3,EE} \ln AO_{EE,t} + \beta_{4,EE} \ln BS_t + \beta_{5,EE} dum + \varepsilon_{EE,t} \quad (6.4)$$

$$\ln EH_t = \beta_{0,EH} + \beta_{1,EH} \ln GDP_t + \beta_{2,EH} \ln AH_t + \beta_{3,EH} \ln AO_{EH,t} + \beta_{4,EH} \ln BS_t + \beta_{5,EH} dum + \varepsilon_{EH,t} \quad (6.5)$$

$$\ln EI_t = \beta_{0,EI} + \beta_{1,EI} \ln GDP_t + \beta_{2,EI} \ln AI_t + \beta_{3,EI} \ln AO_{EI,t} + \beta_{4,EI} \ln BS_t + \beta_{5,EI} dum + \varepsilon_{EI,t} \quad (6.6)$$

$$\ln EG_t = \beta_{0,EG} + \beta_{1,EG} \ln GDP_t + \beta_{2,EG} \ln AG_t + \beta_{3,EG} \ln AG_{EG,t} + \beta_{4,EG} \ln BS_t + \beta_{5,EG} dum + \varepsilon_{EG,t} \quad (6.7)$$

$$\ln REV_t = \beta_{0,REV} + \beta_{1,REV} \ln GDP_t + \beta_{2,REV} \ln A_t + \beta_{3,REV} \ln BS_t + \beta_{4,REV} dum + \varepsilon_{REV,t} \quad (6.8)$$

In each period the government must satisfy an inter temporal budget constraint equal to:

$$REV_t + AE_t + AH_T + AI_T + AG_T + BS_t + DEF_t = EE_t + EH_t + EI_t + EG_t + DS_t \quad (6.9)$$

Which upon aggregation of the project aid and expenditure variables simplifies to:

$$REV_t + \sum_{i=1} A_{i,t} + BS_t + DEF_t = \sum_{i=1} E_{i,t} + DS_t \quad (6.10)$$

where DS_t is debt servicing costs and DEF_t is the government's budget deficit or surplus. As has become standard in the literature, debt servicing is assumed to be exogenous and in this case included in the general government expenditure category, both to preserve degrees of freedom and to keep the model tractable. As is also standard in the literature, the budget deficit is taken as the excluded variable from the system to estimate the jointly determined Equations (6.4–6.8).

Equation (6.10) implies that the identities shown in Equations (6.4–6.8) are jointly determined and hence not independent of one another. This situation violates the OLS assumption of zero error term correlation and will lead to any OLS coefficient estimates being both biased and inconsistent. To deal with this issue, a systems estimation procedure known as SUR is utilised. SUR is a version of multivariate linear regression developed by Zellner (1962) which solves the minimal error variance for the estimated parameters

through the simultaneous estimation of the system of equations.[122] This procedure corrects for the correlation across the error terms in each equation, improving the efficiency of the coefficient estimates[123] (Wooldridge 2002:144).

For each of the development expenditure Equations (6.4–6.6), a positive elasticity coefficient on the respective aid allocation variable ($\beta_{2,Ei} > 0 \;\; i = E,H,I$) would indicate that an increase in aid funding results in increased categorical expenditures for each respective sector. On the other hand, a positive elasticity estimate on the other aid allocation variable ($\beta_{3,Ei} > 0 \;\; i = E,H,I$) would indicate a transfer of resources from other aid funded activities to that expenditure category. Likewise, a positive elasticity estimate on the budgetary support coefficient ($\beta_{4,Ei} > 0 \;\; i = E,H,I$) would indicate that an increase in un earmarked aid funding leads to an increase in expenditure for that development expenditure category.[124]

The aggregate impact of fungibility on expenditure allocations will then depend on all three of these estimated coefficients. This total affect of aid will determine the degree to which fungibility has distorted, if at all, final expenditure allocations for each sector. This approach builds on Pack and Pack (1990:192) and simulates the effect of a percentage increase in total foreign aid per capita (project aid and budgetary support) on each of the expenditure categories.

To do this, the elasticity coefficients together with the historical averages of each of the categories for aid are used to calculate the change in each of the expenditure categories, as well as own-revenues, which results from a simultaneous change in each of the categories of foreign aid. The initial categorical levels of foreign aid are equal to $\overline{A_i}/\overline{A}$ where $\overline{A}$ is total foreign aid and $\overline{A_i}$ is the average level of foreign aid given to category i across the period. For Equation (6.4) the elasticity effect with respect to education aid is equal to:

---

[122] Seemingly unrelated regression estimates are obtained by first estimating a set of non linear equations with cross-equation constraints imposed, but with a diagonal covariance matrix of the disturbances across equations. These parameter estimates are used to form a consistent estimate of the covariance matrix of the disturbances, which is then used as a weighting matrix when the model is re estimated to obtain new values of the parameters. These estimates are consistent and asymptotically normal and, under some conditions, asymptotically more efficient than the single equation estimates.

[123] Notably, estimating a system of equations simultaneously only improves the efficiency of the coefficient estimates if there is some connection between each of the equations of interest (Kennedy 2003:314).

[124] It should be noted that from a theoretical perspective it is also required that the sum of the budgetary support coefficients across all the expenditures not exceed 1.

$$\frac{\partial \ln EE}{\partial \ln EA} = \hat{\beta}_{2EE}$$

where given that EE and EA are measured in natural logarithms, $\hat{\beta}_{2EE}$ represents an elasticity coefficient. This elasticity of education expenditures with respect to education project and program aid can thus be written as:

$$\hat{\beta}_{2EE} = \frac{\Delta EE_t}{\Delta AE_t} \cdot \frac{AE_t}{EE_t}$$

$$\Rightarrow \frac{\Delta EE_t}{\Delta AE_t} = \beta_{2EE} \cdot \frac{EE_t}{AE_t}$$

Multiplying this term by the proportion of an overall aid per capita increase which is allocated to the education sector based on historical averages gives:

$$\frac{\Delta EE_t}{\Delta AE_t} = \beta_{2EE} \frac{EE_t}{AE_t} \frac{\overline{A_E}}{\overline{A}}$$

where $\overline{A}$ is total foreign aid and $\overline{A_E}$ is the average amount of total aid given to the education sector. This can then be rewritten as:

$$d\hat{E}E_{EA,t} = \hat{\beta}_{2EE} \frac{EE_t}{AE_t} dAE$$

where $d\hat{E}E_{EA,t}$ is the total change in education expenditure from a prorated change in project aid allocated to the education sector. Completing the same process for the other project aid and budgetary support variables then gives the total effect of an increase in aid on education expenditures. This can be written as:

$$d\hat{E}E_t = \hat{\beta}_{2EE} \frac{EE_t}{AE_t} dAE + \hat{\beta}_{3EE} \frac{EE_t}{AO_{EEt}} dAO + \hat{\beta}_{4EE} \frac{EE_t}{BS_t} dBS \tag{6.11}$$

where $d\hat{E}E_t$ is the total change in education expenditures from an increase in foreign aid of all types—project aid given to education, other project aid and budgetary support—allocated at historical averages. Equally, the total effect of an increase in aid for the other expenditure and revenue items considered in Equations (6.4–6.9) can be written as:

$$d\hat{E}H_t = \hat{\beta}_{2EH} \frac{EH_t}{AH_t} dAH + \hat{\beta}_{3EH} \frac{EH_t}{AO_{EHt}} dAO + \hat{\beta}_{4EH} \frac{EH_t}{BS_t} dBS \tag{6.12}$$

$$d\hat{E}I_t = \hat{\beta}_{2EI} \frac{EI_t}{AI_t} dAI + \hat{\beta}_{3EI} \frac{EI_t}{AO_{EIt}} dAO + \hat{\beta}_{4EI} \frac{EI_t}{BS_t} dBS \tag{6.13}$$

$$d\hat{EG}_t = \hat{\beta}_{2EI}\frac{EG_t}{AG_t}dAG + \hat{\beta}_{3EI}\frac{EG_t}{AO_{EGt}}dAG + \hat{\beta}_{4EI}\frac{EG_t}{BS_t}dBS \quad (6.14)$$

$$d\hat{REV}_t = \hat{\beta}_{2REV}\frac{REV_t}{A_t}dA + \hat{\beta}_{3REV}\frac{REV_t}{BS_t}dBS \quad (6.15)$$

This model thus has a number of important features which are useful in the analysis of the fiscal effects of aid in the PNG context. Firstly, it distinguishes between 'other project and program aid' and 'general budgetary support aid', which has typically been included in the 'other aid' category in the literature. Secondly, it allows aid to all expenditure categories to influence the consumption choices of government in all, even non aid-receiving, sectors of the economy. Thirdly, it distinguishes between government expenditure and aid revenue according to their function rather than the recurrent and development classifications used in much of the literature. This distinction gives a more relevant assessment of the contribution of fiscal policy settings to key welfare targets such as the MDGs. Lastly, the SUR estimation procedure accounts for the interdependent nature of these fiscal relationships, which allows the estimation procedure to correct for any simultaneity bias which may have occurred within a non simultaneous equation framework.

6.4 Data Collection

As is typical within the literature, the OECD DAC database was used to obtain sectoral aid flows. Optimally, this aid data would record disbursements by sector; however, the database only has a sufficiently complete time series of categorical expenditures on a donor commitment basis—with aid disbursement data only available at an aggregate level. To overcome this, Petterson's (2007) method is followed—sectoral commitment data is used to calculate the share of project and program aid going to each sector as well as the share being given as budgetary support each year. These proportions are then applied to the total disbursements data to give aid allocations by sector and by type (project and program aid vs. budgetary support). Whilst there is little a priori evidence to suggest that certain types of aid would be disbursed more than others following donor commitments, a fundamental assumption of this chapter is that aid disbursements by sector are allocated in the same proportion to which donor commitments are made.

GDP and expenditure data is obtained from the same sources as used in the previous chapter (Appendix 5.1). This chapter also uses the same methodology as established in the previous chapter for the allocation of government expenditure by sector, with the IMF GFS database being used for pre 2002 expenditure data and government budget documents being used for post 2002. This chapter does, however, require a more detailed

matching up of aid allocations with sectoral expenditures. The IMF GFS and OECD DAC databases are not directly comparable and require an element of discretion on the author's behalf as to which expenditure is allocated to which sector. A full description of this can be found in Appendix 6.1.

The general budgetary support variable measures commodity aid and general unallocated program assistance. This includes contributions for general development purposes without sector allocation, with or without restrictions on the specific use of the funds (and irrespective of any control by the donor of the use of counterpart funds). Funds supplied on the general condition that they be used for capital projects at the recipient's choice, but not subject to agreement by the donor, are also included (OECD DAC 2007). Project aid, on the other hand, is defined by the direct participation of the donors in the design and implementation of a developmental project with a specific purpose. This data is measured in US$ and converted into Kina with period average exchange rates. All nominal data are deflated into 1999 constant prices with the consumer price index and measured in per capita natural logarithms. A summary of this data in is presented in Table 6.1.

It should be noted that in some ways this data contradicts that used in the previous chapter. In the previous chapter, for example, project aid flows only began in 1989; the current data has sectoral allocations, albeit relatively small in comparison to budgetary support, beginning in 1974. This reflects the use in the previous chapter of on-budget aid flows whereas the OECD DAC database records aid flows from the perspective of the donor. Prior to the 1990s, little attempt was made in PNG to incorporate project aid flows into the budgetary process.[125] In part, this was because project aid comprised such a small proportion of total foreign assistance. It is also likely to be a reflection of the lower priority that aid donors placed during this period on strengthening local institutional and bureaucratic processes, with aid delivery channels often circumventing domestic budgetary processes. Nevertheless, it is this inconsistency in the available data which is exploited to facilitate the current analysis.

[125] It was not until 1996, for example, that the PNG Government decided to include project aid flows as part of its revenues in the national budget (World Bank 1999:25).

Table 6.1: Summary Statistics of Key Variables—Per Capita Values in 1999 Values (1974–2007)

Variable	Description	Obs	Mean	Std Dev	Min	Max
gdppc	GDP per capita	33	2,323.44	334.20	1,634.80	3,417.37
a_h	Health sector project aid	33	7.11	7.77	0.00	24.39
a_e	Education sector project aid	33	11.32	13.14	0.00	42.16
a_in	Infrastructure sector project aid	33	23.22	17.50	0.00	66.78
a_g	All other general project aid	33	47.66	40.97	4.69	225.87
a_pr	Total project aid	33	89.83	48.90	9.04	251.83
a_bs	Non sector allocated and/or budgetary support aid	33	125.54	119.94	0.00	458.22
e_h	Government expenditure on health	33	52.75	14.43	25.00	73.79
e_e	Government expenditure on education	33	106.66	33.30	29.93	145.56
e_in	Government expenditure on infrastructure	33	58.85	30.08	12.92	130.26
e_g	All other general government expenditure	33	450.79	58.69	325.58	553.42
e	Total government expenditure	33	669.05	103.85	425.05	853.40
rev	Domestic revenue collection	33	489.84	78.28	366.99	637.79

Note: All variables in the table are measured in constant 1999 per capita Kina. Data transformed with natural logarithms for estimations.

6.5 Results

6.5.1 SUR Estimation Results

Table 6.2 presents the results of the simultaneous estimation of Equations (6.4–6.8) using the SUR estimation technique. Each of the equations is well identified with adjusted R^2 values ranging from 0.74 for the education equation to 0.54 for the revenue equation. The only exception is the general expenditure category, which records an R^2 of 0.25, most likely reflecting the much greater degree of aggregation of both the project aid and expenditure data for this category.

Although the above coefficient estimates do not take into account the full effects of foreign aid fungibility as described through Equations (6.11–6.15), a number of important inferences can be made. Firstly, it can be seen that the budgetary support variable has a significant and positive impact on each of the expenditure and revenue equations. The size

of these elasticities ranges from 0.162 in the education equation to 0.026 in terms of revenue collection. In addition, the size of the budgetary support coefficients is much larger for the education, health and infrastructure equations than it is for the general category, indicating that a majority of this financial assistance has tended to be allocated towards these three core development priorities.

Table 6.2: SUR Estimation Results for Categorical Expenditure

SUR	(1)	(2)	(3)	(4)	(5)
	lnEE	lnEH	lnEI	lnEG	lnRev
lngdp	1.213***	-0.306	0.302	-0.032	0.174
	(0.351)	(0.260)	(0.511)	(0.178)	(0.170)
lnAE	0.057*	-	-	-	-
	(0.029)	-	-	-	-
lnAH	-	-0.051*	-	-	-
	-	(0.030)	-	-	-
lnAI	-	-	0.015	-	-
	-	-	(0.051)	-	-
lnAG	-	-	-	0.001	-
	-	-	-	(0.024)	-
$lnOA_i^{\psi}$	-0.034	-0.044	0.093	0.043	-
	(0.074)	(0.055)	(0.086)	(0.032)	-
lnBS	0.162***	0.112***	0.102**	0.034**	0.026*
	(0.033)	(0.024)	(0.048)	(0.017)	(0.014)
lnA	-	-	-	-	-0.095**
	-	-	-	-	(0.042)
Dum	0.137	0.023	-0.534***	-0.038	0.344***
	(0.123)	(0.101)	(0.175)	(0.063)	(0.057)
Constant	-5.448**	6.142***	1.133	6.090***	4.951***
	(2.578)	(1.925)	(3.793)	(1.319)	(1.242)
Obs	33	33	33	33	33
F-Stat	20.47	16.55	10.54	2.51	9.45
(P-value)	(0.000)	(0.000)	(0.000)	(0.033)	(0.000)
Adj. R-Sq	0.743	0.697	0.616	0.248	0.537

Standard errors in parentheses; * significant at 10% level; ** significant at 5% level; *** significant at 1% level. $^{\psi}$ $lnOA_i$ measures total project aid allocations less aid allocations from the dependent variable category (i).

Note: For the purposes of estimation, the origin is re-based to +1 by adding one to each observation. A number of variables in a number of years have observations which are close or equal to zero. Taking the natural logarithm of these values would thus lead to them turning negative and also result in the low values of aid and expenditure allocations becoming more dispersed whilst the higher values become more compressed. In the estimation, this would give undue weight to the lower valued aid and expenditure observations which is likely to cause a bias in the results. Adding one to each of the observations also has the added advantage of allowing the inclusion of the zero valued aid and expenditure observations and allowing all values to remain strictly positive (Van de Sijpe 2007:36).

The positive budgetary support coefficient and the negative total project aid coefficient in the revenue equation provide further evidence for the results obtained in Chapter 5. In this case, the estimations were only able to distinguish a close to zero net effect for both types

of aid delivery on domestic revenue collection, despite overall grants having an unambiguous negative effect. These results suggest however that it has in fact been project aid that has been responsible for a large portion of the negative impact of grants on domestic revenue collection.

The positive coefficients of the categorical aid variables for education and infrastructure indicate that in the first instance an increase in aid to these sectors leads to an increase, albeit small, in total expenditure levels for their respective categories. The negative coefficient on the health foreign aid variable indicates a diversion of aid from this category to other purposes.[126] The degree to which this has taken place will be discussed shortly.

It also appears that there has been a limited amount of redirection of categorical aid amongst each of the development expenditures. For example, education and health have negative coefficients for their other aid variables whilst infrastructure has a positive coefficient, although none are significant. The positive coefficient estimate suggests that a redirection of categorical aid from other expenditure categories has occurred towards the infrastructure sector. In contrast, the negative coefficient estimates arise when there has been a diversion of categorical aid from each of the categorical expenditure items toward other expenditure items. This could include, for example, an increase in debt servicing or a reduction in tax collection.[127]

Of particular interest are the highly significant negative and positive coefficient estimates for the dummy variable in the infrastructure and revenue equations respectively. The former result suggests that in the post Bougainville crisis era, there has been a significant structural reduction in the financing of infrastructure development after controlling for changes in the GDP level and both budgetary support and project aid receipts. This finding supports the conclusion that the crisis has had long lasting impacts on fiscal management and the government's ability to finance critical national infrastructure development projects well beyond the immediate 1991 revenue collapse and the following foreign currency shortages experienced in 1994 (as discussed in Chapter 4).

The latter result also suggests, however, that in the post Bougainville crisis era, the government has sought to augment its domestic revenue collection. This may, for example,

[126] This could include, for example, the financing of a tax reduction or repayment of government debt.

[127] As argued by Pack and Pack (1993:262), 'negative coefficients may arise in the other foreign aid coefficients when there is a diversion of categorical aid from development investment toward, for example, debt service'.

reflect an inherent preference by the government not to rely on aid receipts as a source of revenue in order to avoid a replication of the early 1999s, when the Australian Government's decision to switch from budgetary support to project aid exacerbated an already stressed fiscal situation.[128]

Table 6.3: PNG ODA Allocations by Development Expenditure Category

Sector	(1) Prorated change in foreign aid	(2) Change in expenditure/revenue $\Delta EXP_i = \beta_i \cdot \frac{\bar{A}_i}{\bar{A}} \cdot \frac{Ei}{Ai} \cdot \Delta A$			(3) Total change in expenditure/ revenue
Education	$\bar{A}_i / \bar{A}$	β_i	Ei/Ai[129]	ΔEXP_i	
a) AE	0.056	0.057	8.741	0.0279	
b) AO_E	0.369	-0.034	0.191	-0.0024	(2a+2b) **0.0255**
c) BS	0.575	0.162	0.851	0.0793	(2a+2b+2c) **0.1048**
Health					
a) AH	0.036	-0.051	6.628	-0.0122	
b) AO_H	0.389	-0.044	0.631	-0.0108	(2a+2b) **-0.023**
c) BS	0.575	0.112	0.425	0.0274	(2a+2b+2c) **0.0044**
Infrastructure					
a) AI	0.110	0.015	2.471	0.0041	
b) AO_I	0.315	0.093	0.866	0.0254	(2a+2b) **0.0295**
c) BS	0.575	0.102	0.473	0.0277	(2a+2b+2c) **0.0572**
General					
a) AG	0.221	0.001	9.283	0.0021	
b) AO_G	0.204	0.043	10.119	0.0888	(2a+2b) **0.0909**
c) BS	0.575	0.034	3.570	0.0910	(2a+2b+2c) **0.0182**
Domestic Revenue					
a) A	0.425	-0.095	5.260	-0.212	(2a+2b) **-0.154**
b) BS	0.575	0.026	3.879	0.0579	

To determine the full impact which foreign grants have had on levels of sectoral expenditure, it is, however, necessary to aggregate the impact of both aid given to each of

[128] Given the congruence of timing between the crisis and the major switch between aid types, this coefficient may also reflect a desire by the government to generate additional own-source revenues in order to maintain funding to expenditure areas which were not being supported by project aid receipts.

[129] Such that for the education equation the following calculations are made for rows 1-3 respectively: 1) e_e/a_e 2) ee/a_e_o 3) e_e/bs.

the categorical sectors as well as the influence of other categorical aid and budgetary support. Column 1 in Table 6.3 shows the prorated foreign aid allocations which measure the historical average of aid allocated to each of the relevant sectors. Column 2 shows the individual effects of each type of aid on each expenditure and revenue item calculated according to the method shown in Equations (6.11–6.15). Column 3 then shows the total change in expenditure or revenue expected from a one dollar increase in total aid flows allocated according to its historical mean.

6.5.2 Impact of Project Aid Allocated at Historical Averages (2a+2b)

For every dollar of foreign aid given since independence, 42.5 cents has been in the form of sector allocated project aid. Of this 42.5 cents, 5.6 cents has been allocated to the education sector. The results show that the direct impact of this education aid has been to increase education expenditure by approximately 2.8 cents. The negative result on the other project aid variable, however, indicates that there has also been a diversion of categorical expenditures away from this sector. In addition to debt and revenue responses, this diversion of funds may be suggestive of the existence of aid-induced flypaper effects occurring in other sectors of the economy, whereby an increase in funding for other project aid sectors tends to draw government resources away from the education sector. In this case, however, this effect is relatively small such that the total impact of project aid on education funding is still equal to 2.5 cents for every 5.6 cents of education aid. Whilst a degree of fungibility has taken place, approximately half of the allocated funds appear to have remained within the sector and have not been diverted to other uses. As a result, aid funds have managed to substantially increase the availability of resources in the sector—albeit at a less than one to one ratio.

In contrast to this result, project aid allocated to health and other project aid appear to have had a negative impact on overall expenditure levels within the sector. Here it is observed that the historical average of a 3.6 cent increase in health aid leads to a 1.2 cent decrease in total health expenditures. When combined with the additional diversionary effects of the other project aid variable, this then leads to a total 2.3 cent decline in health expenditure for the additional 42.5 cents of project aid allocated at a historical mean.

As discussed, observations of negative fungibility are in general un intuitive as there is little theoretical reason to believe that an inflow of aid resources to a sector would induce the recipient government to subtract more than that amount of their own funding from the

sector. However, one plausible explanation for this result is the use of aid to pressure the PNG Government to scale-back spending in pursuit of fiscal balance or to increase debt repayments (as found in Chapter 5). Compliance with these conditions requires a decision over which sectors of the budget will receive reduced funding, and in the event that these funding cuts are greater than the inflow of aid, there may be a net outflow of funds from the sector. Another explanation of this effect is the tendency of project aid to reduce domestic revenue collection, which in turn may lower the aggregate availability of domestic resources, which in turn results in reduced funding for the health sector. More broadly, this result also supports the general observations made in Chapter 4 that, despite an increasing amount of donor resources allocated as project and program aid, total per capita expenditure levels in the health sector have continued to fall throughout the past two decades.

Of the three development sectors, infrastructure has been the largest recipient of categorical aid flows, receiving 11 out of every 42.5 cents given as project aid. Of this, only a small portion appears to have remained in the sector, with expenditure increasing by just 0.4 cents for each 11 cents of infrastructure aid. In this case, however, there is also a positive diversion of other project aid funds into the sector equal to approximately 2.5 cents for each additional 31.5 cents of other project aid. This leads to a total increase of infrastructure funding equal to just under 3 cents for each additional 11 cents of infrastructure project aid.

This result appears to be counter intuitive. Why would the PNG Government withdraw resources given directly to the sector and then allocate resources freed up from project aid in other sectors back into infrastructure? There are at least two possible explanations. The first is an issue of timing. These results represent historical averages and the years in which the PNG Government perceives infrastructure funding to be inadequate and the years in which donors tend to increase or decrease their funding to the sector need not necessarily overlap. As a result, the estimates may be observing the transfer of funds between time periods.

The second explanation relates to the within-sector priorities of recipients and donors. In the case of PNG, for example, donors have, particularly in the past, focused a majority of their road building and maintenance attention on highly visible projects with large scale but generally diffused economic benefits, such as the Highlands Highway. The PNG Government may, however, place a higher priority on funding other roads which generate

more political benefit, such as those connecting regions within their particular electorate. One response of the PNG Government to this circumstance could then be to reallocate freed up resources from the donor funded road project to its other expenditure priorities and then divert funds made available from other project aid back into the infrastructure sector to fund its own road building preferences. In any event, both of these arguments highlight the point that sectoral funding levels of the infrastructure sector have been predominately determined by the public sector fiscal behaviour of the PNG Government—despite the high levels of aid being channelled into the sector.

In the general expenditure category, it is again observed that large scale inter sectoral fungibility has taken place, but that the effect of project aid on the sector has remained positive. For every 22 cents of project aid allocated to the general category, expenditure has increased by just over 9 cents. The majority of this increase has, however, occurred as a result of a positive diversion of funds from other sectors into the general category.

Finally, project aid is shown to have had a large negative impact on domestic revenue collection, consistent with the results of the previous chapter. For each additional 42.5 cents of project aid, domestic revenue collection has, on average, declined by approximately 21 cents.

6.5.3 Impact of Budgetary Support Allocated at Historical Averages (2c)

Despite not being tied by donors to any specific activities, budgetary support is shown to have a positive impact on each of the development expenditure categories and on general expenditures. Of the 57 cents of each additional aid dollar allocated as budgetary support, there is a requisite 7.9 cent increase in education funding, 2.7 cent increase in health funding, 2.8 cent increase in infrastructure funding and a 9 cent increase in general government expenditure. To an extent, these results reject the concerns raised in Chapter 4 by various authors about the tendency of budgetary support to fund general government consumption rather than productive investment activities. Every 13.4 cents out of 57 cents given as budgetary support has been allocated to the three development sectors, whilst just 9 cents is allocated towards general expenditure—despite this general category accounting for just over 67 per cent of total government expenditures. Translating these effects into a situation whereby an additional dollar of aid was given entirely as budgetary support also reveals that education expenditure would increase by roughly 14 cents, health and infrastructure would both increase by 5 cents and other general expenditures would increase by 16 cents.

Budgetary support is also shown to augment domestic revenue collection, with the additional 57 cents of non allocated aid leading to an average 5.7 cent increase in domestic revenue collection. As shown in Equation (6.16), the total change in donor resources for budgetary support (ΔBS_t) in any period t, must equal the sum of the total change in expenditure for the four expenditure categories ($\sum_{i=1}^{4} \Delta E_{i,t}$) plus the change in domestic revenue (ΔT_t) and any change in the government's debt liabilities (where $\Delta D_t = \Delta DEF_t + \Delta DS_t$).

$$\Delta BS_t = \sum_{i=1}^{4} \Delta E_{i,t} + \Delta T_t + \Delta D_t \qquad (6.16)$$

Assuming a constant level of project aid, it can be said that the effect of the 57 cents of budgetary support will be to fund an additional 22.4 cents of expenditure and generate an additional 5.8 cents of domestic revenue, which, by implication, also means that it funded a 40.4 cent reduction in the government's deficit/debt liabilities.[130]

6.5.4 Total Impact of Foreign Aid Allocated at Historical Averages (2a+2b+2c)

For each spending category, an additional dollar of foreign aid leads to a positive impact on expenditure levels. Only in the case of the education sector, however, does the increase in categorical expenditure meet or exceed the increase in categorical aid flows. For every dollar of aid, about 5.6 cents has been allocated to the education sector, which when combined with the positive impact of budgetary support, has led to an increase in total education funding by just over 10 cents.

In contrast, for every additional dollar of aid, about 3.6 cents has been allocated to the health sector. This additional 3.6 cents of directly targeted assistance has, however, managed to increase total funding for the sector by only approximately 0.44 cents. Likewise, despite the infrastructure sector receiving approximately 11 cents in each aid dollar since independence, the resulting increase in total funding to the sector has only increased by approximately half that amount, at 5.7 cents. For these last two categories then it is clear that there has been a substantial diversion of funds by the government away from the intended donor expenditure patterns. In the general expenditure category, for

[130] It is worthwhile to note here the consistency of these results with those observed in the previous chapter, which also found that a majority of budget support had been used to reduce debt obligations whilst also leading to marginal increases in expenditure.

each additional dollar of grant aid, of which 22 cents per aid dollar has been allocated towards general expenditure, there is a relatively small 2 cent increase in expenditure levels for the sector.

Finally, as discussed, the 57 per cent of aid allocated as budgetary support has tended to have a positive impact on domestic revenue collection, whilst the 43 per cent allocated as project aid has had a negative impact. The positive effect of budgetary support is, however, approximately one-quarter the size of the negative impact of project aid, which leads to an overall negative impact of aid on revenue collection equal to 15 cents for each additional dollar of aid allocated. These results are also consistent with Feeny (2007) who found that aid to the Melanesian region as a whole has had a limited impact on encouraging growth in rural areas, partly as a result of the negative effect of aid on domestic revenue collection efforts.[131]

6.6 Discussion and Conclusion

This chapter has analysed a variety of issues related to the impact of aid on sectoral expenditure in post independence PNG. In particular, it has sought to assess the relative impact of budgetary support vis-à-vis project-based aid on increasing aggregate expenditure levels in three key development sectors of the PNG economy—health, education and infrastructure. It has also analysed the extent to which funds allocated to these sectors have been diverted to general government consumption activities. In total, aid has made a positive contribution to the overall funding levels of all expenditure categories in PNG since independence. This result does, however, mask a number of important differences between project aid and budgetary support across sectors the results of which are summarised in Appendix 6.2.

Firstly, there is significant evidence for project aid showing that large scale fungibility has taken place across a number of sectors of the PNG economy, with expenditure increases far below the allocated project aid amounts. According to historical averages, for a given increase in education funding, total resources to that sector increase by about half that amount whilst total infrastructure spending increases by approximately one-third of the

[131] This shifting impact of aid on revenue may also reflect the changing quality of governance observed in PNG during this period. Gupta et al. (2003), for example, find that whilst foreign aid has in general tended to have only a relatively small dampening effect on the revenue collection efforts of recipient governments, in countries plagued by high levels of corruption, the decline in revenues tends to completely offset any increase in grants. The widely acknowledge decline in governance and bureaucratic quality experienced in PNG, especially during the 1990s may in part then help to explain why budgetary support has been more effective at stimulating an increase in domestic revenue collection.

amount allocated as project aid. Likewise, just under half of the project aid allocated to the general category has remained in the sector. In contrast, project aid by itself appears to have had a negative impact on overall expenditure levels within the health sector.

Secondly, approximately half of the budgetary support has been used to finance higher levels of government expenditure. Of this increased expenditure, 60 per cent has been allocated to the health, education and infrastructure sectors whilst the remaining 40 per cent has been allocated to the general government expenditure category. This is a relatively positive result, especially given that this general category accounts for two-thirds of total government expenditures. The remaining budgetary support funds have been used primarily to achieve a reduction in the government's deficit and debt liabilities.

Thirdly, in terms of revenue collection, the majority of the negative impact of foreign grants appears to have occurred during the project aid rather than budgetary support period. An explanation for this result is that even though during the budget support era the PNG Government was receiving far greater levels of foreign assistance, there was a clear mandate provided by Australia for a reduction in aid flows—on average budget support declined by 8 per cent per annum in real per capita terms between 1975 and 1989. In contrast, the project aid period, whilst contributing less to overall government resources, has experienced relatively stable real per capita funding levels—imposing less pressure on the PNG Government to find domestic resources to replace aid funds.

The significant reduction in the financing of infrastructure in the post Bougainville era also supports the conclusion that the crisis has had long lasting impacts on fiscal management, well beyond the immediate 1991 revenue collapse and the following foreign currency shortages experienced in 1994. These results also support those general correlations observed in the data from Chapter 4 as well as the fiscal response coefficients obtained in Chapter 5—in particular, with regards to the relatively benign impact which the shift from budgetary support to project aid has had on aggregate expenditure levels in each of the core development sectors. This adds an additional degree of confidence in the results, especially as they have been derived from aid commitment data rather than actual disbursements.

The results offer a number of important policy implications as donors seek to help PNG reach its MDG targets. Firstly, it must be said that the existence of fungibility is not a sufficient condition to establish the effectiveness or ineffectiveness of foreign aid per se.

Rather, it offers an important insight into how foreign aid interacts with public sector behaviour to influence aggregate fiscal outcomes. In particular, these results highlight that it is the way in which the recipient government responds to an aid inflow that matters most in determining the effectiveness of that aid in improving service delivery to specific sectors. The lesson for donors here is that efforts to alter how they give aid in order to control its usage will almost inevitably be circumvented by a government who wishes to fund other priorities. The focus of development discourse therefore must remain on establishing a productive dialogue between donor and recipient to determine mutually agreeable expenditure priorities and not on increasingly tying aid to specific activities which the donor finds appealing. This approach aligns with the commitments made by the Australian Government following the Paris Declaration on Aid Effectiveness in 2005 and the Accra High Level Forum on Aid Effectiveness in 2008. Both of these agreements emphasised the importance of allowing the recipient country to direct the allocation of financial resources as a means of establishing country ownership and ensuring that aid funds were aligned with national priorities (ODI 2008).

This evidence also disputes the notion that PNG health, education and infrastructure outcomes can be improved simply by aid agencies choosing to re-align their aid allocations towards these sectors. This highlights the point that achieving the MDGs rests not with the provision of donor-funded resources to a particular sector but rather with the PNG Government's desire and, just as importantly, ability, to effectively resource and implement programs in each one of these sectors. Hence, the effectiveness of aid should not be judged on how stringent the expenditure controls are or how tightly aligned aid-funded expenditures are with donor priorities but rather how useful that assistance has been in promoting improvements in the recipient government's own expenditure management systems, processes and outcomes.

Finally, as Australia seeks to increase the performance orientation of its aid program, it may consider opening up the potential for using alternative un-earmarked aid modalities—such as budgetary support. The results have shown that tying aid funds to specific expenditure priorities has given donors a false sense that their aid allocations can influence aggregate spending outcomes. Loosening the grip which donors have placed on their funding in return for specific expenditure behaviour may thus prove to be a productive way forward for the Australian aid program in PNG. How this may be implemented is discussed in the final policy implications chapter.

Chapter 7: Foreign Aid and Public Sector Efficiency in PNG—A Health Sector Case Study

7.1 Introduction

This chapter analyses how the public spending allocations discussed in the previous two chapters have influenced social welfare outcomes in PNG. It also seeks to determine whether foreign aid, and in particular technical assistance, has helped or hindered the efficiency of the PNG public sector at translating this public spending into social welfare outcomes.

Chapter 3 illustrated that the challenges facing AusAID, and other donors, as they seek to help the PNG Government improve the quality of public service delivery are by no means unique. Global evidence of the impacts of technical assistance continues to highlight its limitations as a means of enhancing the capacity of recipient agencies. Brautigam (1999) and ODE (2008b:32), for example, both quote a World Bank vice-president in saying that technical assistance has been 'a systematic destructive force which is undermining the development of capacity'. Likewise, Kapur et al. (1997:421) claim that in countries with weak institutions, interventions to strengthen state bureaucracies have tended to actually 'delay the development of effective, self-reliant cadres and institutions'.

Chapter 3 also illustrated that foreign aid and in particular technical assistance decreases in its ability to help strengthen government effectiveness as recipients decrease both in size and as they move into the fragile states classification. Whilst PNG is well above the population threshold at which the total impact of foreign aid becomes negative, its low absolute levels of administrative capacity, close patronage relationships within its bureaucracy and limited human capital suggest that it may be particularly susceptible to the costs which foreign aid can place on a recipient bureaucracy—in terms of crowding out domestic capacity, creating an excessive administrative burden and soaking up scarce institutional resources to meet donor reporting and design requirements.

To address the questions above this analysis relies on a case study of the PNG health sector. The PNG health sector serves as a useful case study for a number of reasons—firstly, because it has stood at the forefront of many Australian aid initiatives in PNG. The health sector was the first to receive a Sector Wide Approach (SWAp) funding arrangement from Australia, and most recently it developed a Capacity Building Service Centre that works with the PNG Government to determine appropriate forms of technical assistance (Land 2007:14).

PNG's health sector has also acted as a focal point for many of the criticisms of technical assistance in the country. In particular, concerns have been raised over the volume and coordination of advisory support, particularly within the National Department of Health (DoH). Following an evaluation of donor support to PNG's health sector, ADB (2003:26) argued that technical assistance had encouraged 'a very costly workforce, whose objectives and expected results are not formally agreed upon; which may not always provide capacity building; which sometimes simply substitutes for local staff; whose performance is not measured by DoH; and...whose presence may de-motivate national staff'. The report links this to 'unilateral planning and implementation practices of donor partners—the very practices which the SWAp arrangement hopes to curtail'. Likewise, Cammack (2008) highlights that the PNG health sector has been one of the most dysfunctional, poorly coordinated sectors of the PNG bureaucracy. Cammack (2008:52) also argues that attempts by donors to harmonise their support mechanisms have 'been discouraged by the PNG government, which views this as donors "ganging up" rather than as a positive move to coordinate aid.'

To conduct the analysis this chapter draws again on the VECM technique to estimate the identities derived in Equations (4.18–4.19) across a 33 year time span of data. Key findings include that public health spending has been a key determinant of public health outcomes in PNG. Technical assistance given to the health sector has, however, lowered the marginal effectiveness of public spending at improving health outcomes. In this sense, technical assistance has had a lower per Kina impact on improving health outcomes than other types of spending. This result highlights the need for AusAID and other donors to look at new mechanisms for providing support to the sector—perhaps with a greater focus on the funding of goods and services rather than the provision of expensive technical advisors.

7.2 Literature Review

7.2.1 Past Studies

There are a number of strands of literature which relate to this study. The first such area has studied the impact of public spending on social welfare outcomes, in particular, health outcomes such as life expectancy and infant mortality rates. The results of this research have been varied. Some studies have found that heath spending has had an insignificant impact on standard measures of health outcomes. This was the case for Deolalikar (2005) who studied a panel of provinces within India between 1980 and 1999, as well as for Kim and Moody (1992), Musgrove (1996) and Filmer and Pritchett (1999) who all studied large cross sections of developing countries over varying time periods. These studies also find

that a number of other factors have been much more influential in determining health outcomes, including, for example, income levels and inequality (Deolalikar 2005), levels of education—particularly those of females (Kim and Moody 1992), as well as social determinants such as ethnic fragmentation and the quality of domestic governance (Musgrove 1996; Filmer and Pritchett 1999).

In addition to these factors, many other studies have found a strong positive association between public spending and health outcomes. Hojman (1996), for example, found that for a number of Caribbean and Central American countries, health spending had a significant impact on improving a wide range of health status indicators. The World Bank (1995) found similar results for public health spending in the Philippines, except that this effect was only found to hold for the poorer regions of the country. At the cross-country level, Bidani and Ravallion (1997) and Gupta et al. (1999) found that for a sample of 50 and 70 developing countries respectively, public health spending had a significant impact on reducing child mortality. Gani (2009) also provides a study of Pacific island states between 1990 and 2002, finding that on average, a 10 per cent increase in per capita health expenditure leads to a 6.6 per cent reduction in infant mortality rates.

These contrasting results suggest that it is a country's individual circumstances which matter most for the transformation of public expenditure allocations into productive investments that contribute to positive health and development outcomes. A key question for donors then is what determines whether a recipient bureaucracy is capable of, or how efficient they are at, translating public spending into improved health outcomes.

Rajkumar and Swaroop (2002) examine the role of domestic governance in influencing public sector efficiency at improving the quality of education and health outcomes. The authors find that for a panel of 98 countries in 1990 and 1997, the quality of domestic governance—measured via indicators of corruption and bureaucratic quality—was a key determinant of whether increases in spending translate into improved social welfare outcomes.

Feeny and Rogers (2007; 2008) provide the only study to directly assess the contribution of foreign aid to these outcomes, focusing in particular on how SIDS compare to other

developing countries in this regard.[132] Analysing a panel of developing countries between 1990 and 2004, the authors find that both governance and literacy levels have been significant determinants of public sector efficiency, although, even after taking these factors into account, SIDS still persistently underperform compared to other developing countries. Foreign aid is found to have had no impact on life expectancy during this period, an effect which they attribute to the heterogeneity of aid flows, much of which is not targeted at improving life expectancy. The authors also find considerable diversity across sectors, with the efficiency of aid and public sector spending at improving life expectancy deteriorating during the 1990s but increasing for school enrolments across the same period.

7.2.2 Research Gap

This chapter seeks to augment the available evidence on these issues in a number of ways. Firstly, whilst previous studies have focused almost exclusively on cross-country comparisons, this chapter seeks to conduct an analysis of the PNG health sector to gain more specific insights into how aid impacts on public sector efficiency at the country level. To do this estimates are made which determine the impact of foreign aid on inter temporal changes in public sector efficiency within PNG.

Secondly, the chapter seeks to delineate between those types of aid which may have some impact on public sector efficiency and those which are targeted at simply filling in resource gaps by providing funds for additional goods and services. This issue is particularly pertinent in the case of PNG as the large volumes of budgetary support which the country has received have neither been targeted at, nor have been likely to impact on, the efficiency of public sector expenditure. In contrast, the more recent focus on improving governance and administrative systems with the use of technical assistance has been aimed directly at these issues. This issue was raised in Feeny and Rogers (2008:535) who state that '[a] potential explanation for the finding of no impact of foreign aid on life expectancy is that foreign aid consists of heterogeneous flows, many of which should not be expected to have an impact on life expectancy'. In addition, however, another issue is that even aid not specifically targeted at social sectors may have important flow-on impacts on the efficiency of the public sector at delivering these services. The plethora of central agency administrative and bureaucratic support under the ECP and SGP programs in PNG is a pertinent example of this.

[132] To do this, the authors estimate Stochastic Production Functions for a large number of countries, including SIDS, for both life expectancy and school enrolments. The various levels of public sector efficiency which are calculated from this analysis are then used as dependent variables to determine which factors have had the largest role in explaining these levels of efficiency.

Rather than using an aggregate or sectoral measure of aid, this chapter focuses on assessing the contribution of aid which has been targeted specifically at addressing institutional and administrative capacity gaps within the PNG bureaucracy, which is measured by the level of technical assistance given to the PNG public sector. Measuring the impact of technical assistance on public sector efficiency assumes that the remaining components of foreign aid have had no significant impact on public sector efficiency in the PNG health sector. For the 57 per cent of PNG's total foreign aid which it has received in the form of budgetary support, this is a reasonable assumption. However, for the remaining components of project and program aid which have not been delivered through technical assistance this requires an assumption that spending by donors on health sector outputs has been no more or less efficient than the PNG bureaucracy at improving health outcomes.

Another limitation of previous studies on aid and public sector efficiency is that they have failed to treat each of the variables under consideration as interdependent.[133] Feeny and Rogers (2008) made allowance for aid and public spending to have delayed effects on the dependent variable by including lagged values of the explanatory variables into their estimations. This selection of a one-year lag is, however, at best, an arbitrary choice, and as the authors note, '[t]he issue of how to appropriately incorporate lags of expenditures into such an analysis is problematic and remains an important area for future research' (Feeny and Rogers 2008:531).

This chapter seeks to advance these issues by adopting the dynamic VECM estimation method, which uses the data itself to determine appropriate lag lengths and which incorporates the full range of feedback effects that can occur between the aid, fiscal and social outcome variables. This approach also has its limitations. The most important of these again relates to the limited sample size, and the availability and quality of data which can be used in conducting a country-level analysis of PNG. To minimise the potential impact of these limitations, this chapter conducts another data collection exercise by compiling a national aggregate index of health outcomes and generating two measures of political instability in post independence PNG to control for variations in government

[133] The interdependent nature of these relationships is emphasised in the specification derived in Equations (4.18–4.19). Technical assistance, for example, is designed to effect the efficiency of public service delivery, which, combined with public expenditure, will flow on to effect income growth. Income growth will then likely affect social welfare outcomes and public sector capacity, which again may be a determinant of the amount of aid received as technical assistance.

performance. These variables are then combined with the fiscal and aid data of the previous three chapters to conduct the analysis.

7.3 The Model

The system of equations shown in Equations (4.16) provides the basis for the following analysis. Taking natural logarithms in order to linearise the first row of the system of equations gives:

$$\ln \Phi_{i,t} = \sum_i \Lambda_i + \alpha \ln(Y_t / N_t) + \left(\chi_{0,t} + \chi_{1,t} \cdot \mathrm{T}_t\right) \beta_i \ln(E_{Di,t}). \tag{7.1}$$

Health outcomes are thus assumed to be primarily a function of per capita income, health expenditure as a per cent of real GDP, an interaction term between health expenditure and technical assistance as a per cent of GDP as well as a vector of other control variables. Similarly, extending the framework to the system of interdependent equations given in Equation (4.19) also implies that each of the other variables is a function of the others. Per capita income, for example, is assumed to be a function of health expenditure and its interaction term with technical assistance, health outcomes and the vector of other control variables.

As shall be shown, each of the variables used in this estimation is non stationary, and integrated to the first order I(1). As such, the appropriate estimation approach is again through the VECM framework outlined in Chapter 5. In this case, each of the variables is first differenced to establish stationarity and then these differenced variables are applied to the VECM framework via Granger's representation theorem (Engle and Granger 1987). The linear combination of these variables may then be interpreted as their long term relationship, or in economic terms, as static equilibrium relations (Johansen 1988; Johansen and Juselius 1990). The general form of the estimation of Equation (7.1) can be written as:

$$\begin{aligned} \Delta \mathrm{X}_t &= c_{10} + \alpha_X \psi_{X,t-1} + \sum_{i=1}^{n} \alpha_{1i} \Delta X_{t-i} + \sum_{i=1}^{n} \alpha_{2i} \Delta Y_{t-i} + \varepsilon_{X_t} \\ \Delta Y_t &= c_{20} - \alpha_Y \psi_{Y,t-1} + \sum_{i=1}^{n} \alpha_{3i} \Delta X_{t-i} + \sum_{i=1}^{n} \alpha_{4i} \Delta Y_{t-i} + \varepsilon_{Y_t} \end{aligned} \tag{7.2}$$

where Δ is the difference operator such that $\Delta \mathrm{X}_t = X_t - X_{t-1}$ and i again refers to the number of lags in the model. Of interest are the $\alpha_X \psi_{X,t-1}$ and $\alpha_Y \psi_{Y,t-1}$ error correction terms which represent the stationary linear combination of the co-integrated variables (Johansen 1988). The coefficient on the error correction term, α, represents the speed of adjustment to out-of-equilibrium movements in any of the variables (Dolado et al.

2001:638).[134] This dynamic framework will also determine whether there exists a long run cointegrating relationship amongst these variables, as well as how each of them adjusts to changes in the system of equations.

7.4 Data Collection

7.4.1 Health Outcomes

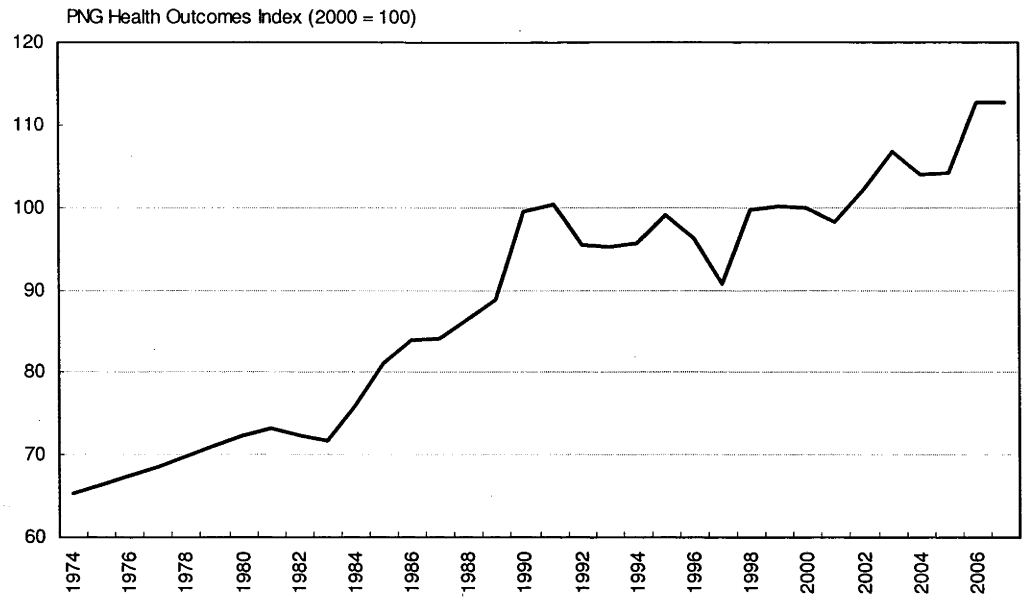
To measure PNG health outcomes, this chapter develops an aggregate index comprising data from life expectancy, the number of infant deaths under the age of one per 1,000 live births and the proportion of the population aged between 12 months and 23 months that is immunised against diphtheria, whooping cough and tetanus. All data is sourced from the World Development Indicators database (World Bank 2009). These health indicators are used widely as indicators of aggregate health outcomes and comprise components of the United Nations Human Development Index. These data are also the most reliable and consistent across the 33-year time span considered in this study.

To construct the aggregate index, each of these measures is first computed as an individual index with the inverse of infant mortality utilised so that increases in each index represent improvements in health outcomes. The year 2000 is taken as the base year for each index and missing observations are linearly extrapolated. Each of the three indexes is then combined with equal weighting into an average health outcomes index. This process generates a series shown below in Chart 7.1.

Here it can be seen that during the early post independence period, PNG recorded relatively stable growth in its aggregate health outcomes. This period of relative progress then stalled during the late 1980s and throughout the 1990s, coinciding with the onset of considerable macroeconomic and political instability. The period between 1993 and 2002 per capita also saw a decline in health funding from K62 per capita to K25 per capita in real terms (Chart 4.3). In the most recent decade, average health outcomes have again shown signs of improvement, increasing in particular in the post 2002 period, which has also seen a considerable increase both in per capita income levels and per capita spending on health outcomes.

[134] For example, if each of the variables is cointegrated, then each of the disequilibrium error terms will be stationary. This means there is a force pulling the residual errors towards zero, with previous departures from equilibrium being corrected by changes in some or all of the fiscal variables.

Chart 7.1 PNG Health Outcomes Index (1974–2007)



Source: AusAID (2009) and author's calculations.

7.4.2 GDP Per Capita, Health Expenditure and Technical Assistance

GDP per capita is measured in thousands of constant 1999 Kina. As in the previous chapters, this data has been deflated into constant 1999 prices using the consumer price index. Health expenditure is also measured in constant 1999 prices and expressed as a per cent of real GDP. Both of these data series are sourced from the same process as described in the previous two chapters (see Appendix 5.1). Technical assistance data is sourced from OECD DAC (2009) and originally expressed in nominal US$. This data is then converted into Kina using annual average exchange rates sourced from annual PNG budget documents, deflated into constant 1999 terms with the Consumer Price Index (CPI) and then expressed as a per cent of real GDP.

7.4.3 Other Control Variables

The first control variable included in the estimation is a measure of all remaining government expenditures as a per cent of GDP. This variable is included to reflect the ability of government expenditure in other sectors of the economy to cross-subsidise improvements made within the health sector. For example, higher levels of education spending may help to promote greater levels of community awareness over primary health issues. Likewise, expenditure on infrastructure or law and order may make it more feasible for people in remote areas to access essential health services. This variable is measured in constant 1999 Kina as a per cent of real GDP and is drawn from the same source as the other fiscal and economic data outlined in Appendix 5.1.

The other control variables used in the estimation seek to measure the impact of governance and politics on PNG's fiscal and social welfare performance. Politics in post independence PNG has been categorised by weak party systems and fragile coalitions which have been required to form government from a large number of different parties. This has led to a high degree of discontinuity of governments who have often failed before undertaking their full term in office (Faal 2007). Indeed, the electoral term between 2002 and 2007 was the first time a government, led by Prime Minister Somare, has served its full five-year term in office since independence. The resulting discontinuity of governments has been highly disruptive to the policy-making process in PNG, reducing the predictability of policy regimes and the efficiency of fiscal administration. This political instability has also had significant impacts on the public service, which has often become heavily politicised in turn, reducing the efficiency of its day-to-day administration (Saldanha 2005:7).

To measure the impact of these varying degrees of government instability across the post independence period, two different measures of government fractionalisation are used. The first, measures the number of legislative parties which have been required to form each of PNG's coalition governments. This variable is defined as the sum of squared seats of all parties within the government.

$$\Omega_t = \sum_{p=1}^{P} s_{p,t}^2 \tag{7.3}$$

where s_p is the share of seats held by party p in the government at time t, and P is the number of parties in government. This variable is akin to a political Herfindahl index, with higher values of the index indicating less fractionalisation and lower values indicating more fractionalisation. The second measure of government fractionalisation measures the probability that any two deputies picked at random from amongst the government parties will be from two different parties. This variable is defined as:

$$\Gamma_t = 1 - \sum_{i=1}^{P} \omega_{i,t}^2 \tag{7.4}$$

where $\omega_{i,t}$ is the share of group i in the government coalition at time t. In contrast to the political Herfindahl index, this index focuses on the amount of political influence which each of the coalition parties have been able to obtain through their ability to obtain deputy seats within the government. When $\Gamma_t = 0$ there is no fractionalisation of parties within government. This is likely to represent a relative cohesion of political opinion. In contrast, as Γ_t approaches one there is an increasing probability that each of the government's deputies will come from different parties. Such a legislature is thus assumed to be more

likely to be divided, with a lower degree of policy coherence. In this way the variable provides an alternative proxy for the level of political fractionalisation faced by each successive government. The data for both of these political fractionalisation indexes is sourced from DPI (2008).

Table 7.1: Summary Statistics of Key Variables

Description	Label	N	Mean	Max	Min	St. Dev
Health Index	Ln(Φ)	33	4.470	4.725	4.181	0.171
Health Expenditure as a per cent of GDP	Ln(E/Y)	33	3.923	4.301	3.219	0.309
Health Expenditure and Technical Assistance interaction term	T* Ln(E/Y)	33	7.946	29.451	1.591	6.289
Real GDP per capita	Ln(Y/N)	33	7.741	8.137	7.399	0.144
Other Expenditure as a per cent of GDP	Ln((E_O)/Y)	33	6.412	6.684	5.992	0.159
Herfindhal Index of Government	GovHerf	33	0.538	0.828	0.230	0.252
Government fractionalisation	GovFrac	33	0.473	0.787	0.181	0.257

7.5 Results

The first step in the estimation process is to establish the stationarity of each of the variables. Table 5.2 presents the results of Augmented Dickey Fuller tests of each variable and its first differenced value. In each case, the test rejects the null hypothesis of non stationarity at a 99 per cent confidence interval. Following the first differencing of each of these variables, however, each is shown to be stationary and thus integrated to the first order, I(1). It is therefore appropriate to estimate models that include variables in their first differenced form through the VECM procedure.

Table 7.2: Stationarity Test for Key Variables

Variable	ADF Test Stat	ADF Critical Value	ADF *p-value*	ADF Test Stat after 1st Difference	ADF Critical Value after 1st Difference	ADF p-value after 1st Difference	Stationary
LnΦ	-0.792	-3.702	0.821	-5.196	-3.709	0.000	I(1)
Ln(Y/N)	-3.167	-3.702	0.022	-5.094	-3.709	0.000	I(1)
Ln(E/Y)	-1.337	-3.702	0.612	-8.032	-3.709	0.000	I(1)
T* Ln(E/Y)	-3.064	-3.702	0.030	-3.875	-3.709	0.002	I(1)
Ln((E_O)/Y)	-2.081	-3.702	0.254	-4.754	-3.709	0.0001	I(1)
GovFrac	-1.600	-3.702	0.483	-6.021	-3.709	0.000	I(1)
GovHerf	-1.596	-3.702	0.485	-5.386	-3.709	0.000	I(1)

Before applying the Johansen approach to test for the cointegrating relationships, it is important to first determine the optimal lag length, or order, of the VECM. Table 7.3

presents both the AIC and HQIC test statistics which are utilised by selecting the lag length which gives the lowest possible value of the information criteria test (Gujarati 2003:537). In the current case, both are minimised with the use of two lags. Two lags are chosen for the following estimations.

Table 7.3: Selection Order Criteria

Selection Order Criteria		
Lag	**AIC**	**HQIC**
0	-2.508	-2.419
1	-7.793	-7.166
2	-8.002*	-8.594*

Note: In order to preserve the limited degrees of freedom within the model, the maximum lag length is set to two lags. With the removal of this restriction the optimal lag lengths increases in size to three. For this reason, the core estimations are also replicated using this three-year lag structure to test whether the results are robust to this restriction. As discussed in the main text, the results are comparably similar.

The next step is to use the Johansen trace statistic test to determine the cointegrating rank of the model. Again, this process is based on Johansen's trace test statistic (Johansen 1988; Maddala and Kim 1998:211). The results are shown in Table 7.4. The trace test rejects the null hypothesis of no cointegrating vectors but fails to reject the null hypothesis of one cointegrating vector. That is to say, there exists one linear combination of the variables.

Table 7.4: Cointegration Tests for Model I

Maximum Rank	H^0: Number of Cointegrating Vectors (v)	Trace Statistic	95% Critical Value	Eigenvalue
0	None	93.0319*	94.15	.
1	At most 1	56.6428	68.52	0.69082
2	At most 2	31.0823	47.21	0.56156

*denotes rejection of the null hypothesis that there are *r* cointegrating vectors at 5 per cent significance level.

Table 7.5 below presents the results of the long run cointegrating relationship amongst the variables within the VECM framework. In accordance with the VECM procedure, the cointegrating relationship is normalised, in this case on the key dependent variable of interest, with the public health outcomes index taking on a unitary value (Lutkepohl 1991).[135] Row 1 presents the results of the core model.

[135] As explained in Chapter 5, because the variables show an identity equated to zero a positive coefficient estimate suggests a negative *ceteris paribus* long run relationship with the normalised health outcomes index. Vice-versa, a negative coefficient estimate suggests a positive *ceteris paribus* long run relationship with the normalised health outcomes index.

Here it can be seen that the negative and highly statistically significant coefficient estimates on the GDP per capita variable indicate that income has been a major positive determinant of health outcomes across this period. The health expenditure variable also has an intuitively signed negative coefficient estimate; however, in this case it is statistically insignificant. When this term is interacted with the technical assistance variable, however, the estimation records a highly significant positive coefficient. This indicates that over the long term increases in technical assistance have been associated with a deterioration in the efficiency of public health expenditure in improving health outcomes. The Herfindahl index of government fractionalisation is also intuitively signed with a negative and highly significant coefficient estimate. This indicates that a lower fractionalisation of government coalitions has tended to lead to improved long run health outcomes.

Rows 2–5 also present a number of alternative specifications in order to test the robustness of these results to small changes in how the model is estimated. Row 2 re-estimates the core model with the exclusion of the health expenditure and technical assistance interaction term. In this case, the health expenditure variable becomes, as expected, negative and highly significant, suggesting that increases in public health spending have indeed helped to improve public health outcomes. The GDP per capita, government fractionalisation and other expenditure variables maintain coefficients of the same sign and significance.

Row 3 re-estimates the core specification with the use of the alternative measure of government fractionalisation. In this case, increasing the government fractionalisation variable leads to poorer health outcomes. This is again in line with the hypothesis that long run social outcomes have been negatively influenced by the highly fragmented nature of politics in post independence PNG. Each of the other variables maintains its sign, size and significance, suggesting that the results are robust to changes in how political fractionalisation has been measured.

Row 4 then re-estimates the core specification with the use of a three instead of two-year lag structure. This is to test whether the initial restriction of the number of lags not exceeding two, placed in order to preserve degrees of freedom, has influenced the results. Each of these long run cointegrating relationships maintains its sign, size and significance as in the core specification. Finally, Row 5 again estimates the model with a three-year lag structure, but in this case with the alternative measure of political fractionalisation. Again, the results are comparatively similar to that of the previous models, with coefficient estimates shown to be robust to changes in both the lag structure and the measure of

political fractionalisation. The consistency of these alternative specifications gives a degree of confidence in the robustness of the core models results.

Table 7.5: Cointegrating Relationships for Models I–V

Variable	LnΦ	Ln(Y/N)	Ln(E/Y)	T* Ln(E/Y)	Ln((E_O)/Y)	HerfGov	GovFrac
Model I: Core							
1. Coefficient	1	-0.611***	-0.189	0.044***	1.529***	-0.296***	-
Standard Error	-	(0.225)	(0.183)	(0.006)	(0.359)	(0.098)	-
Model II: No Interaction Term							
2. Coefficient	1	-89.257***	-39.069***	-	133.366***	-15.076**	-
Standard Error	-	(16.976)	(9.020)	-	(25.145)	(7.223)	-
Model III: Alternative Government Fractionalisation							
3. Coefficient	1	-0.649***	-0.220	0.042***	1.548***	-	0.309***
Standard Error	-	(0.220)	(0.175)	(0.066)	(0.341)	-	(0.093)
Model IV: 3-Year Lag Period							
4. Coefficient	1	-0.915***	-0.066	0.059***	1.812***	-0.412***	-
Standard Error	-	(0.138)	(0.087)	(0.003)	(0.211)	(0.041)	-
Model V: Alternative Government Fractionalisation with 3-Year Lag							
5. Coefficient	1	-0.917***	-0.084	0.057***	1.763***	-	0.412***
Standard Error	-	(0.133)	(0.085)	(0.003)	(0.200)	-	(0.041)

Standard errors in parenthesis. * p<.1; ** p<.05; *** p<.01. Johansen normalisation restriction imposed.

Whilst the core focus of this analysis has rested on analysing the long term cointegrating relationships amongst these variables, Table 7.6 also presents the results of the short run VECM coefficients. In this case, the estimated coefficients for the error correction term reveal which of the variables adjust to correct imbalances in the system of equations whilst the variable coefficients show the short run effects of changes in the explanatory variables on the dependent variable.

The results indicate firstly that the majority of adjustment in post independence PNG to shocks in health outcomes has occurred through changes in government health expenditures. For the health expenditure variable, the lagged error correction term, L.π, is significant and negatively signed, whilst for the health expenditure and technical assistance interaction term the lagged error correction term, L.π, is significant and positively signed. Each of the lagged error correction terms for the other variables in the system is insignificant at a 90 per cent confidence level. Notably, this result also aligns with those found in Chapter 5, which illustrated that government expenditure has been the key adjustment mechanism to fiscal shocks across this period.

Table 7.6: VECM Results for Core Model I

	1/ LnΦ	2/ Ln(Y/N)	3/ Ln(E/Y)	4/ T* Ln(E/Y)	5/ HerfGov	6/ lnE_h_o
L.π	0.080	-0.082	-0.411*	10.941***	0.106	0.062
	(0.060)	(0.126)	(0.212)	(2.119)	(0.226)	(0.128)
L.LnΦ	0.043	-0.175	0.296	-14.737**	-0.378	0.450
	(0.213)	(0.447)	(0.755)	(7.517)	(0.804)	(0.455)
L.Ln(Y/N)	-0.158	0.240	0.012	-6.107	-0.350	0.160
	(0.116)	(0.245)	(0.413)	(4.116)	(0.440)	(0.249)
L.Ln(E/Y)	0.114**	0.072	-0.573***	-2.181	-0.321*	-0.089
	(0.051)	(0.108)	(0.182)	(1.819)	(0.194)	(0.110)
L.T* Ln(E/Y)	-0.004	0.001	0.013	-0.066	-0.007	-0.003
	(0.003)	(0.007)	(0.014)	(0.130)	(0.013)	(0.007)
L.Ln((E_O)/ Y)	-0.098	0.042	0.510	7.768**	0.126	0.142
	(0.096)	(0.202)	(0.342)	(3.410)	(0.365)	(0.206)
L.HerfGov	-0.037	-0.068	0.132	-0.104	-0.028	0.158
	(0.054)	(0.115)	(0.194)	(1.936)	(0.226)	(0.117)
Normality Test (Jarque-Bera)						
χ^2	8.861	2.459	1.932	3.935	27.239	3.481
(Prob> χ^2)	(0.012)	(0.292)	(0.380)	(0.139)	(0.000)	(0.317)
All – Normality		**Autocorrelation**	**- Lag 1 –**	**- Lag 2 –**		
χ^2	45.097	χ^2	46.4765	42.1885		
(Prob> χ^2)	(0.0001)	(Prob> χ^2)	0.11337	0.22098		

* p<.1; ** p<.05; *** p<.01. All the estimations are made with an unrestricted constant in the model. Autocorrelation tests H^0: No autocorrelation at lag order. Fail to reject the null hypothesis of no autocorrelation. The STATA small sample adjustment was used when calculating the estimated variance-covariance matrix of the disturbances for the Jarque-Bera normality test.

Further support for the significance of health spending on health outcomes is shown in the core VECM equation given in Column 1 showing the short run impact of each of the explanatory variables on health outcomes. This estimation shows that the only variable to have a significant influence on short run health outcomes is the lagged value of public health spending. This result is likely to represent the impact of health spending on the more sensitive health parameters such as child immunisation rates and, to a lesser extent, child mortality. For these variables, additional spending can lead to quite rapid changes in on-the-ground outcomes, in contrast to average life expectancy which changes more slowly over time. Each of the other equations show few significant short run effects between each of these variables, again highlighting the longer term relationships which have been the core focus of this study.

Table 7.6 also presents the results of the Jarque-Bera normality test (Jarque and Bera 1980) as well as a test for residual autocorrelation. The health outcomes index, per capita GDP, health expenditure, the interaction term and the other expenditure variables all have test statistics which fail to reject the null hypothesis that the data are from a normal distribution at a 95 per cent confidence level. Similarly, the tests for residual autocorrelation in each of the equations as well as for the entire model fail to reject the null hypothesis of no

autocorrelation. However, in the case of the government fractionalisation index, the calculated Jarque-Bera statistic is 27.239, indicating moderately skewed residuals. As such, a note of caution is warranted as the test rejects the null hypothesis of normal residuals at a 95 per cent confidence interval.

One explanation for this result is the sharp fluctuations of this variable over time following the election of new governments or changes in the composition of governments. It may also reflect the poor finite sample properties of the Jarque-Bera test and its sensitivity to any outlying values (Lawford 2004). One option may be to remove a number of outlying residuals from the sample set; however, given the small sample size properties of the data, this would potentially result in an important loss of information. Whilst the consistency of the coefficient estimates across the two different measures of political instability gives a degree of confidence in their results, the failure of this normality assumption means that these results should be treated with care.

7.6 Discussion and Conclusion

This chapter has sought to analyse how the provision of technical assistance has influenced the efficiency of public health spending in delivering improved health outcomes to PNG. This chapter is the first to draw on the VECM framework to conduct a country-level case study of a SIDS. Evidence indicates that there exists a negative long term relationship between technical assistance and the efficiency of the PNG bureaucracy in utilising additional health resources. This chapter has also found evidence that higher levels of public health spending are associated with improved health outcomes and that per capita income and political fractionalisation have also been key determinants of long run health outcome trends.

In addition to those mentioned above, some further limitations to this analysis are worth noting. AusAID and its donor partners have been involved in a continual process of reform over how and how much technical assistance has been delivered to PNG. Evidence that past technical assistance efforts have had a negative impact on public sector efficiency need not necessarily imply that future efforts will have the same result. Further, data limitations mean that these results only apply to the health sector—within which technical assistance has been heavily criticised. As shown in Feeny and Rogers (2007; 2008), public sector efficiency outcomes can vary considerably across sectors. A finding that technical assistance has had a detrimental effect in one sector need not necessarily imply that it is the

same across all other sectors. This chapter has also focused explicitly on the role of technical assistance. In practice, the delivery of project and program aid may also contribute, or erode, the performance of the recipient agency.

A useful extension to this study may be to incorporate these alternative aid flows into the analysis. Another useful extension of this analysis may be to isolate those components of technical assistance which have been targeted directly at the health sector. This approach would be complicated by the significant spill over effects of technical assistance in other sectors to influence public expenditure efficiency in the health sector. Improving central government agencies budgeting and planning processes is a pertinent example of this, and is also why this study utilised total levels of technical assistance. Nevertheless, allowing for potentially divergent impacts of technical assistance targeted at different sectors may be a useful area for further research.

Limitations also relate to measuring health outcomes. The availability and quality of data constrained the health index to the combination of just three outcome indicators. In practice, the health sector targets improvements across a much wider range of factors than those encapsulated within these measures. Each of these indicators, especially life expectancy, also changes slowly over time. This is likely to have contributed to the estimation's limited ability to pick up short run variations in the public sector's efficiency in delivering health services. It is for this reason that the estimation results have been focused on identifying the long run cointegrating relationships present within the data.

These limitations notwithstanding, the results presented herein raise a number of important policy implications. The first is the result that technical assistance in PNG has tended to reduce the efficiency of public spending at improving health outcomes. This is not to say that technical assistance has had an overall negative impact on capacity within these agencies or that it has contributed to poorer health outcomes. Rather, aid funds allocated as technical assistance to the health sector are less effective at improving health outcomes than the PNG Government's own spending allocations.

The most plausible explanation for this relates to the high cost of technical assistance. ODE (2007), for example, estimates that it costs the Australian Government between A$340,000 and A$400,000 to place a single mid level government adviser within the PNG bureaucracy. The additional long term efficiency which the provision of technical advisers has created within the health bureaucracy (either through providing additional bureaucratic

resources or expanding the capacity of existing workers) has been worth less than the cost of their placement. Thus a reduction in public sector efficiency is observed.

The poor value for money offered by technical assistance does suggest a need to revise Australia's policy of giving more aid in the form of technical assistance than any other major bilateral donor. In particular, as Australia seeks to make faster rates of progress against MDG indicators in PNG, short term improvements in health indicators may be more efficiently funded via alternative aid modalities—perhaps through a greater focus on funding goods and services rather than providing advisers.

Having said this, PNG clearly has significant capacity constraints within its bureaucracy which need to be addressed. Technical assistance will inevitably be an important component of trying to correct this. Therefore there should also be a focus on increasing the marginal effectiveness of technical assistance so that its impact justifies its cost. Central to this task will be increasing the focus placed on delivering technical assistance to those areas of the PNG bureaucracy which have a demand for its presence. As discussed, the placement of technical advisers within PNG has been heavily criticised on the grounds that it has been very much a supply-led process.[136] Ultimately, however, it is the domestic political and bureaucratic will for change that will determine whether or not technical assistance can contribute to improvements in public sector capacity.

Overcoming these constraints so that technical assistance can be provided to areas of the PNG bureaucracy where it will be used most effectively is thus a core challenge for the Australian aid program both in PNG and in the other SIDS of the South Pacific. How this may be achieved is discussed in the final policy implications section of the following chapter.

[136] There are many anecdotal causes for the poor levels of domestic ownership of donor technical assistance efforts in PNG. These include, and are not limited to, weak departmental capacity limiting the ability of the recipient agency to engage in a productive and timely dialogue with the donor agency about capacity needs; concerns by ministers, secretaries and senior officials over the impact which technical assistance may have on their power relations and discretionary decision making within the agency or department; perceptions of foreign, especially Australian, interference in the domestic policy-making process, reducing senior officials' desire for assistance; lack of knowledge by recipient agency of where capacity needs exist; large reporting burden placed on recipients to comply with requirements of donor agencies; motivations of aid agencies to push ahead with program roll-out despite lack of input from recipient agency, departmental secretary or minister; and, a general understanding by recipients of the inability of donors to withhold funding despite a lack of compliance with agreed terms.

Chapter 8: Conclusions and Policy Implications

8.1 Summary of Findings and Contributions

This study has sought to analyse a variety of issues relating to how foreign aid has influenced the government and bureaucratic behaviour of the SIDS of the South Pacific, and that of PNG in particular. This focus was motivated by a number of factors; firstly, by the growing concern which Australia has placed on the threat of failed or failing states in the region. Secondly, although it can be debated whether Australian aid has made substantive contributions to specific outcomes, it is increasingly clear that foreign assistance has not been able to foster a growing sense of security or prosperity in the region. Undertaking research which explores the unique challenges of the small and often fragile island developing states of the South Pacific is thus of increasing importance. This research also coincides with a growing focus in AusAID on enhancing the effectiveness of its aid program, witnessed in part by the establishment of the ODE in 2006.

It is also for these reasons that this study has taken a broader approach to assessing the effectiveness of Australian aid in general rather than providing impact assessments of individual projects or aid modalities. Understanding and measuring the impact of aid on specific outcomes at specific points in time is no doubt important. However, in the absence of a well designed overarching aid framework which seeks to improve the entire public expenditure behaviour of a recipient government, micro level successes are unlikely to contribute to longer term development gains. These issues are particularly pertinent in the SIDS of the South Pacific which have weak public sector management and significant resource constraints.

This study has brought together and extended a range of empirical methods and techniques used within the aid effectiveness literature. Five main empirical chapters have been presented together with a historical analysis of PNG's fiscal policy since independence. The remainder of this section will discuss the core findings and contributions of each of these chapters. The following section will then use these conclusions to draw some policy lessons arising from the analysis.

8.1.1 Australian Aid Motivations and Allocation Criteria

Chapter 2 considered the big picture of Australian aid, analysing its changing motivations and the impact that this has had on its allocation patterns and criteria.

Methodological Contributions

This chapter used econometric techniques to estimate a utility maximising model of donor behaviour which controlled for the censored nature of the dependent variable. The chapter also adapted the Tobit decomposition method to give a more detailed exposition of the dual nature of the Australian aid allocation process. A long time series of data was considered which allowed the analysis of two major government reviews on the allocation priorities of Australian aid and also whether Australia has been increasingly influenced by policy-based selectivity in the current decade. This chapter justified an alternate distance based measure of Australia's strategic motivations of aid which was shown to reflect the regional strategic and security based imperatives of the aid program. Finally, the aid allocation framework was used to analyse the motivations behind Australia's increasing shift towards giving aid through technical assistance.

Development and Aid Policy Contributions

The results showed that whilst Australia has considered all aspects of recipient need, donor interest and colonial heritage in determining its aid allocations, the last decade has seen a declining influence of colonial legacy, a rise of regional priorities and a persistent small country bias in Australian aid allocations. In the post Simons Review era, there has been a decline in the recipient need motivation of Australian aid and an increasing responsiveness to good governance criteria. This chapter also showed that Australia has tended to give more technical assistance to countries which are smaller, geographically closer, display a poorer control of corruption and with which it has larger trade partnerships. These results challenged the claim that Australia can pursue both humanitarian and foreign policy priorities without compromising the aid programs ability to allocate aid on the basis of recipient need.

8.1.2 Foreign Aid and Government Effectiveness in Small States

The third chapter analysed the impact of foreign aid on the effectiveness of recipient governments to provide public services and establish an environment conducive to broad based wealth creation. This chapter isolated the impact of Australian aid and technical assistance and compared them vis-à-vis other types of aid delivery and from other donors. The chapter sought to determine in particular whether the effect of any one of these types of aid was altered when given to developing states with small population sizes typical of the SIDS of the South Pacific.

Methodological Contributions

This chapter adopted advanced estimation methods which better control for the endogenous explanatory variables in the model than many other studies in the literature. The estimation process controlled for institutional persistence, which was previously not used in the only other study to consider the divergent impact of aid across country size. This chapter also collected a large cross-country data set across a 10 year panel with a large amount of data included for a number of small states, particularly those in the South Pacific. Finally, a more rigorous testing of the 2SLS first stage F-Statistic identification assumption was adopted, previously unused in the aid effectiveness literature.

Development and Aid Policy Contributions

Strong support was found for the notion that the positive impact of aid on government effectiveness tends to diminish as countries decrease in population. The diminishing marginal returns to aid in population were shown to be most pronounced within the technical assistance component of aid. This reflects the larger burden which foreign aid places on small states in terms of soaking up scarce bureaucratic capacity, distorting incentives for responsible fiscal management and encouraging rent seeking behaviour. Illustrating the importance of this result to Australia, was also the finding that these effects are particularly pronounced within the Australian aid program, reflecting the large volumes of Australian aid which have been delivered to the SIDS of the South Pacific.

8.1.3 A History of Foreign Aid and Fiscal Policy in PNG

The fourth chapter continued the analysis of the interaction between foreign aid and recipient government behaviour in SIDS by introducing a country level case study of PNG. This included reviewing available theoretical evidence for how foreign aid can influence various elements of the recipient's fiscal behaviour including the management of fiscal aggregates, sectoral expenditures and public sector efficiency. This chapter then provided a historical analysis of the interaction between each of these elements of fiscal policy in post independence PNG.

Methodological Contributions

This chapter developed a model of aid and fiscal behaviour which incorporated fiscal aggregates, sectoral expenditures and public sector efficiency. This provided the theoretical basis for the following three empirical chapters.

Development and Aid Policy Contributions

The historical analysis illustrated that despite high levels of external financing, successive PNG Governments have continued to resort to persistent deficit financing of their budget. Between 1975 and 2002, this led to growing levels of public debt, and on three separate occasions a lack of fiscal discipline contributed to economic crises which required donor-funded bail-outs. The drastic switch between budgetary support and project aid was shown to have coincided with the fiscal pressures experienced by the government resulting from the Bougainville crisis. This led to significant pressures for high levels of aid fungibility to occur. Finally, this chapter showed that the increasing focus by donors on providing finance that is tied to specific activities such as project and program aid has not led to an improvement in the development orientation of sectoral expenditure outputs.

8.1.3 Foreign Aid and Fiscal Aggregates in PNG

The fifth chapter provided the first empirical case study of PNG by assessing the impact of foreign grant aid on the management of PNG fiscal aggregates since independence. This study sought to answer a number of questions raised in the historical analysis of Chapter 4 regarding whether grant aid has encouraged less responsible debt management behaviour, whether grant aid has provided a disincentive to expand domestic revenue collection and whether grant aid has encouraged unproductive government expenditure.

Methodological Contributions

The VECM approach used in this chapter offered a number of advantages over traditional FRMs which have had difficulties in determining appropriate target variables and which are limited in their ability to consider long run dynamics. The use of the VECM approach included analysing both the short and long term relationships between each of the fiscal aggregates and imposing a variety of aid impulses on the data. This was the first study to apply these methods to PNG with an extensive data collection exercise that allowed for an analysis of the relationships between grant aid, public debt, domestic revenue and development expenditure allocations. This study was also the first within the dynamic fiscal response literature to consider the potentially divergent impact of budgetary support grants vis-à-vis project aid grants on the fiscal behaviour of government.

Development and Aid Policy Contributions

The results illustrated a clear tendency for aid to lower the PNG Government's domestic revenue collection efforts. Grant aid was also shown to have had a significant impact on lowering levels of public debt which in turn meant that aid flows in aggregate have had a

minimal impact on increasing levels of public expenditure. Preliminary evidence suggests that budget support in particular has a strong relationship with the lower domestic revenue and lower domestic borrowing effects. Budget support also supports an improvement in expenditure composition towards the development expenditures category. Project aid on the other hand has contributed more to higher rates of government expenditure than debt reduction, although the majority of this has been in the general rather than development expenditure category.

8.1.4 Foreign Aid and Sectoral Expenditures in PNG

The sixth chapter focused specifically on the impact of aid on the expenditure priorities and outcomes of the PNG Government. In particular, it sought to further assess the relative impact of budgetary support vis-à-vis project-based aid on increasing aggregate expenditure levels in three key development sectors of the PNG economy—health, education and infrastructure. It also analysed the extent to which funds allocated to these sectors have been diverted to other general government spending activities.

Methodological Contributions

This chapter extended the literature firstly by developing a model of inter sectoral aid fungibility which disaggregates foreign grants into earmarked forms of aid such as project and program assistance and un-earmarked assistance such as budgetary support. This model was then estimated with the SUR technique which provided static coefficient estimates to augment the dynamic analysis of the previous chapter. Unlike other studies, this chapter allowed for divergent impacts between each of these different types of aid delivery, reducing the potential for an upward bias of fungibility estimates. To conduct this analysis, the chapter also undertook a substantial data collection exercise to facilitate the sectoral analysis of PNG since it gained independence.

Development and Aid Policy Contributions

The results of this chapter supported those obtained from the dynamic analysis in Chapter 5 and also supported a number of the general correlations observed in the historical analysis from Chapter 4. In particular, they explain why the shift from budgetary support to project aid has had a relatively benign impact on improving aggregate expenditure levels in each of the core development sectors considered.

In total, aid was shown to have made a positive contribution to the overall funding levels of all expenditure categories in PNG since independence. Since the introduction of project

and program aid however, large scale fungibility has taken place across a number of sectors of the PNG economy, with expenditure increases far below the amount of aid allocated to each sector. In contrast, the criticism that budget support was used to finance unproductive government expenditures appear unfounded. The results showed that of the 50 per cent of budget support that was used to finance higher levels of expenditures, 60 per cent was allocated to the health, education and infrastructure sectors whilst the remaining 40 per cent was allocated to the general government expenditure category. The remaining budgetary support funds were used to lower tax collection and reduce the government's debt liabilities. These results illustrated that it has not been the type of aid that has determined the ability of donors to provide additional resources for key service delivery sectors but rather the behavioural response of the PNG Government to that aid inflow.

8.1.5 Foreign Aid and Public Sector Efficiency in PNG

The seventh chapter of this study considered the impact of technical assistance on the efficiency of public spending allocations to improve social welfare outcomes, with a case study of the PNG health sector.

Methodological Contributions

This chapter extended the literature by conducting a country-level analysis of the impact of technical assistance on the effectiveness of public spending using the dynamic VECM estimation process. An index of health welfare outcomes and two new measures of political fractionalisation in PNG were constructed. This chapter also developed a model which focused explicitly on the role of technical assistance in influencing these outcomes as this more accurately reflected the component of aid which is likely to influence public sector efficiency.

Development and Aid Policy Contributions

This chapter presented evidence for public health spending being a key determinant of PNG health outcomes, highlighting the importance of improving per capita expenditure levels in key service delivery sectors of the economy. The chapter also showed that the delivery of technical assistance has tended to reduce public sector efficiency in the health sector. The high cost of technical assistance has meant that in per Kina terms, an additional adviser contributes less to improving health outcomes than if that money was spent on other items, perhaps through providing goods and services. In this way, technical assistance is shown to lower the marginal effectiveness of public health spending at improving health outcomes.

8.2 Limitations and Areas for Further Study

In addition to those noted within each chapter, it is worth noting some of the limitations to the broader approach taken in this analysis as well as the areas for opportunities for further research.

The first major constraint relates to data quality and reliability, especially in regards to those chapters using the PNG case study. A number of different data collection exercises were undertaken to try and minimise this limitation. As much as possible, this data was obtained from common primary sources across the entire post independence period. However, even when sourced from official budget documents, much of the empirical analysis relies on data which is of questionable quality. Over time as more data is collected and its quality improved, much of this limitation may dissipate. The limited time series considered in each of these case studies also led to a number of the empirical results being fragile.

Another limitation of the approach taken in this dissertation has been its heavy focus on PNG as a case study for the rest of the region. In practice, PNG is much larger in both its economy and population than most other countries in the region. This has meant that it has been one of the lowest per capita recipients of aid in the region. PNG also has a relatively unique history of how it has received foreign assistance, with clear policy delineations between the eras of budgetary support, project aid, program support and most recently, technical assistance. PNG may therefore provide limited lessons for smaller, more aid-dependent countries in the region. In particular, micro states on the edge of economic viability are likely to face a different set of policy problems than these larger countries.

Each of these limitations opens up areas for future research. In particular, study may be usefully directed at further investigating the impact of aid on the fiscal behaviour and public sector efficiency of other SIDS within the South Pacific. This could include a comparison of results with countries such as the Solomon Islands which has recently been receiving assistance levels in excess of 65 per cent of GDP. Following further data collection, public sector efficiency studies may also be usefully extended to other key sectors of the PNG economy such as education and infrastructure.

8.3 Policy Implications

Whilst the design or implementation of aid programs is far beyond the scope and purpose of this study, this final section seeks to briefly outline how some of these principles may be translated into practical policy lessons for improving the quality of Australia's aid. In particular, it offers lessons for PNG; however, many of these may be equally applicable to the other SIDS of the South Pacific. These recommendations can be broadly classified into three strands.

8.3.1 Integrate Funding to an Overarching Public Expenditure Framework

If PNG is to achieve faster rates of progress towards goals such as the MDGs, then a scaling-up of both per capita expenditures for social services and the efficiency of that spending in improving social outcomes will be needed. This will require careful planning on behalf of both the PNG Government and its donor partners in the allocation of public spending in terms of sectoral allocation, sequencing and its macroeconomic implications.

Past approaches of tying foreign aid to specific standalone projects and even more recently to sector-wide programs has offered donors a false sense of having some control over what their assistance has ended up financing; fungibility has been rife, particularly within key service delivery sectors such as health and education. Aid has also undermined domestic revenue collection, creating a state of perpetual aid dependence as the government continues to draw on a narrow tax base and delays necessary reforms required to expand the private sector.

One method of overcoming many of these issues may be to tie foreign assistance to an overall Public Expenditure Program (PEP) which specifies an agreed level of adequate resources across the entire range of macroeconomic management and social service delivery sectors. At the macroeconomic level, this may include targets surrounding aggregate levels of public spending in lieu of revenue outcomes, as well as performance across debt management within a medium term macroeconomic framework. At the sectoral level, this could include targets for sufficient levels of aggregate spending being allocated to programs across all key social welfare sectors. In practice, many of these objectives have already been laid out by the PNG Government in its Medium Term Fiscal, Debt and Development Strategies (GoPNG 2005a; GoPNG 2005b; GoPNG 2006). With the inclusion of sectoral targets for key service delivery sectors over the medium term horizon, these objectives could be then be extended into a consolidated PEP. Within the

PEP, donors would nominate the resource contributions which they intended to make to each one of these outcomes, and would then be responsible for monitoring the recipient government's aggregate expenditure levels across each of these sectors.[137]

This approach would offer donors a number of advantages. Firstly, it would circumvent the ability of the PNG Government to re-direct its own resources in response to aid inflows. This would help to ensure that injections of foreign resources led to improvements in aggregate funding levels for key development sectors. Secondly, it would help to remove a tendency of donors to conduct projects outside the budget process, placing less of an emphasis on accounting for where aid dollars end up and placing more of a focus on how aid contributes to the entire public expenditure behaviour of government. The setting of sectoral expenditure targets would also offer a strong public accountability measure, highlighting the at times opaque funding levels delivered through the budget process.

Of course, recipient governments are unlikely to look favourably on having their entire public expenditure program reviewed on a regular basis by donors. Thus, implementing a performance-based system following the satisfactory achievement of each expenditure target, or a number of them, would also be an important component of the PEP support. This shall be discussed in section 8.3.3.

8.3.2 Pooling of Aid Funds for Both PEP Support and Technical Assistance

Minimising the bureaucratic burden which foreign assistance places on recipient bureaucracies is another key reform target for donors operating in PNG and the SIDS of the South Pacific more generally. In these environments, many of the adverse consequences of aid have been amplified due to small and often already weak public sectors which have a limited ability to cope with the administrative and bureaucratic burden placed on them by donors.

One method to support more effective foreign aid in these environments would be to pool all donor resources into a common fund to support the PEP. From this fund, donors would work collaboratively and with the recipient government through its domestic

[137] Variations of this type of scheme have also been proposed by other authors. Most notably, Devrajan and Swaroop (1998) propose that instead of development agencies focusing on project rates of return the focus of assistance efforts should be placed on how this assistance contributed to an entire PEP. These authors propose however that the system should be implemented via a loan based system through what they term a Public Expenditure Reform Loan (PERL) which ties external finance to the recipient achieving a satisfactory outcome for its PEP.

budgeting process to decide what levels of foreign financial support will be given to each sector within the PEP. According to their contributions, donors could then decide on which projects or programs they would carry out themselves, which would be outsourced to the private sector, and following the satisfactory meeting of certain conditions (discussed in more detail shortly), which funds could simply be given to the recipient government to implement via its own domestic bureaucracy. This approach would help to minimise the bureaucratic burden which donors place on the recipient bureaucracy with the design and implementation of a myriad development programs across the country.

In addition to the general PEP fund, another fund could also be established to pool all donor support targeted at bureaucratic and governance training. This common technical assistance pool could then be used to provide funds for bureaucratic support programs to all levels of the recipient government. Under this arrangement, however, donors would no longer independently design and implement technical assistance projects. Rather, funds would be pooled into the common facility which would require each recipient agency or department to complete some pre determined application process outlining their intended use of the technical assistance, its duration, and how it will contribute to improving the efficiency of public spending and the achievement of the government's PEP framework. The donor agencies together with representatives from the government would then decide which proposals were most competitive and offer the best value for money.

Each domestic agency would then essentially be competing for the provision of donor-funded technical assistance. Over time, those agencies that were most capable of using, and have a desire for, technical assistance would become apparent and would be rewarded with further assistance. Those agencies which demonstrated that they did not have a strong desire for technical assistance would receive reduced levels of support. This approach highlights the fact that without bureaucratic or political ownership, technical assistance is unlikely to have any impact on the performance of the recipient agency, and in many cases is likely to worsen that agency's performance.

Following their acceptance for the allocation of funding, agencies that demonstrated they were capable of using technical assistance effectively could also be given the opportunity to decide how much of these funds would be used to recruit technical advisers (either from international or domestic sources) through a competitive tender process. De-linking technical assistance from direct donor funding would allow agencies to reward experts and

consultants who have skills that are sought after by their agency and establish a more competitive knowledge market.

Introducing a competitive tender process whereby advisers would compete to provide technical assistance to various government agencies may also give a greater incentive to recipients to treat these resources as their own, and spend them wisely, for example, by searching for well-recommended and inexpensive technical assistance from South and East Asia. This may help to drive down the current high cost of providing advisory support. Alternatively, agencies should be free to defer advisory support entirely and request assistance which is targeted at personnel training and development of their own staff.

Ultimately, the pooling of aid funds for both sectoral support and technical assistance can enhance the effectiveness of technical assistance by driving down its costs and increasing its level of domestic ownership. Notably, this pooling of funds would also require a significant improvement in the ability of both donors and recipients to prioritise where technical assistance is most effective, and perhaps most importantly, to reject assistance to those areas which were not seen to have a desired impact so that resources could be directed elsewhere.

8.3.3 Introduce Budgetary Support into the Policy Mix

As mentioned, it is likely that recipient governments will not look favourably on having their public expenditure program scrutinised to the degree that would be required under a PEP. Offering worthwhile incentives then will be an integral component of its implementation.

One approach which could be taken is that if performance against the PEP is deemed to be satisfactory, donors may increasingly shift a portion of the pooled funding directly into the government's revenue collection through direct budgetary support. This has a number of advantages for both donors and recipients. Firstly, it would prevent donors from having to appraise and finance individual projects through their own administrative systems and agents, replicating the costs of the recipient government. The institutional problems and high transaction costs that accompany multitudes of donors would be avoided. Delivering aid as general budgetary support also means that recipient governments maintain control and ownership, strengthening their own domestic institutional processes. Also, unlike previous attempts at offering budgetary support, tying the delivery of this aid to an entire

PEP ensures that funds are used to finance a productive expenditure mix and encourage sensible macroeconomic management.

Under this system, when good leaders do emerge, they can be rewarded with aid that increases their ownership, legitimacy and accountability to their people for development performance. In the event that the recipient continues to meet the PEP criteria, then the role of the donor might also evolve away from delivering services and toward serving as a clearing house of information, or as a more competitive source of technical assistance. In the event that the recipient lacked the political will to meet the PEP targets then aid delivery would simply return to its existing modalities.

This approach would, under the appropriate conditions, facilitate the transfer of resources without the high transaction costs of program and project negotiations, and minimise the costs of technical assistance. Notably, this would also require a level of flexibility and adaptability not previously seen by aid donors in countries such as PNG.

The final point worth noting about the potential for budgetary support is that in the face of the growing regional self interest priorities outlined in this study, it is clear that efforts by Australia to link large aid volumes to performance-based measures will continue to suffer from a lack of credibility within the SIDS of the South Pacific. Offering budgetary support as a potential reward mechanism also then has the added advantage of the donor maintaining a credible threat for its reduction. For example, in the event that the PNG Government decides to no longer meet the targets identified in the PEP, then funding would not have to be reduced but rather would simply be redirected to the aid agency to implement via its project or program support facilities.

By altering the composition of aid rather than its levels, Australia can circumvent both the pressures it faces to disburse aid within the South Pacific and the institutional inertia it faces when trying to impose sanctions on recipient governments. This would significantly strengthen the credibility of an Australian-based reward system in countries such as PNG, helping to circumvent what has been termed the Samaritan's dilemma.

8.4 Concluding Remarks

The plethora of political and administrative challenges in implementing such a wide ranging reform of the aid system in countries such as PNG are too numerous to mention. However, whether or not one believes that foreign aid has contributed to PNG's

development at the margins, it is indisputable that it is far from achieving its goal of fostering functioning and effective states conducive to widespread wealth creation and improving living standards. As a result, change should not be seen as an option but as a necessity.

Supporting an expansion of basic service delivery will continue to be a major feature of Australia's engagement in PNG and the South Pacific. Breakdowns in health, education and essential infrastructure services not only have a significant human cost but they also serve to undermine the legitimacy of nation states and can provide the catalyst for instability. However, seeking to fund these activities in the absence of political or bureaucratic support is unlikely to lead to sufficient progress in these areas. As Australia undertakes another big push of aid delivery in the South Pacific, a much more substantial effort needs to be made in order to delve deeper into the various routes and transmission mechanisms through which the various types of aid operate. Implementing an economy-wide donor-financed public financial management system which pooled donor funds and rewarded good performance with untied budgetary support could be a core component of these efforts.

Appendices

Appendix 1.1: List of Small Island Developing States

American Samoa*	Marshall Islands*
Anguilla	Mauritius
Antigua and Barbuda	Montserrat
Aruba	Nauru*
Bahamas	Netherlands Antilles
Bahrain	New Caledonia*
Barbados	Niue*
Belize	Northern Marianas Islands*
British Virgin Islands	Palau*
Cape Verde	Papua New Guinea*
Comoros	Puerto Rico
Cook Islands*	Samoa*
Cuba	São Tomé and Principe
Dominica	Seychelles
Dominican Republic	Solomon Islands*
Federated States of Micronesia*	St. Kitts and Nevis
Fiji*	St. Lucia
French Polynesia*	St. Vincent and the Grenadines
Grenada	Suriname
Guam	Timor-Lesté
Guinea-Bissau	Tonga*
Guyana	Trinidad and Tobago
Haiti	Tuvalu*
Jamaica	U.S. Virgin Islands
Kiribati*	Vanuatu*
Maldives	

* Countries of the South Pacific.

Source: UN DESA (2008).

Appendix 2.1: List of British Colonies and Protectorates

1. Anguilla	2. Malta
3. Antigua	4. Mauritius
5. Bahamas	6. Montserrat
7. Bahrain	8. Myanmar
9. Bangladesh	10. Namibia
11. Barbados	12. Nauru
13. Belize	14. Nigeria
15. Bermuda	16. Niue
17. Botswana	18. Pakistan
19. Brunei	20. Palestinian Adm. areas
21. Cameroon	22. Papua New Guinea
23. Cayman Islands	24. Qatar
25. Cook Islands	26. Samoa
27. Cyprus	28. Seychelles
29. Dominica	30. Sierra Leone
31. Egypt	32. Singapore
33. Falkland Islands	34. Solomon Islands
35. Fiji	36. Somalia
37. Gambia	38. South Africa
39. Georgia	40. Sri Lanka
41. Ghana	42. St Helena
43. Gibraltar	44. St Kitts Nevis
45. Grenada	46. St Lucia
47. Guyana	48. St Vincent
49. Hong Kong	50. Sudan
51. India	52. Swaziland
53. Iraq	54. Tanzania
55. Israel	56. Tonga
57. Jamaica	58. Trinidad and Tobago
59. Jordan	60. Turks and Caicos Islands
61. Kenya	62. Tuvalu
63. Kiribati	64. Uganda
65. Kuwait	66. Vanuatu
67. Lesotho	68. Virgin Islands
69. Malawi	70. Yemen
71. Malaysia	72. Zambia
73. Maldives	74. Zimbabwe

Source: Institute of Commonwealth Studies (2007).

Appendix 2.2: Data Sources and Descriptions for Chapter 2

Aid Data (1980–2005)

Description: ODA flows as used in this study are defined by OECD DAC (2007) as 'official financing administered with the promotion of the economic development and welfare of developing countries as the main objective, and which are concessional in character with a grant element of at least 25 per cent (using a fixed 10 per cent rate of discount). By convention, ODA flows comprise contributions of donor government agencies, at all levels, to developing countries ("bilateral ODA") and to multilateral institutions. ODA receipts comprise disbursements by bilateral donors and multilateral institutions.'

Source: OECD DAC (2008)

Notes: Measured in constant 2005 US$

Label: ODA

GDP Per Capita Growth and GDP Per Capita Data (1980–2005)

Description: GDP per capita and GDP per capita growth measured in constant 1985 international dollars.

Source: Heston, Summers and Aten (2006)

Notes: A number of Pacific Island countries were not included in the Heston et al. (2006) database. For these countries data was taken from ADB (2008) which included Fiji, Kiribati, Marshall Islands, Micronesia, Palau, Samoa, Solomon Islands, Tonga, Timor-Leste and Vanuatu. This GDP data was taken in nominal US$ values and then converted to real US$ using the PWT GDP deflator.

Label: Rgdpch and Rgdpchg respectively

Distance Data

Description: Great circle distance between capital cities.

Source: Byers (2007)

Notes: The great circle distance is the shortest distance between any two points on the surface of a sphere measured along a path on the surface of the sphere (as opposed to going through the sphere's interior).

Label: Distj

Population Data

Description: Total population of recipient country.

Source: Heston, Summers and Aten (2006)

Notes: Measured in '000s of people.

Notes: As before a number of Pacific Island countries were not included in the Heston et al. (2006) database. For Fiji, Kiribati, Marshall Islands, Micronesia, Palau, Samoa, Solomon Islands, Tonga, Timor-Leste and Vanuatu data was taken from ADB (2008).

Label: Pop

Infant Mortality

Description: Mortality rate, infant (per 1,000 live births).

Source: World Bank (2008a)

Notes: Missing values for a variety of countries where linearly extrapolated between observations. In cases where the most recent observation was before 2004, the infant mortality rate has been kept constant.

Label: Infmort

British Colony Data

Description: Those countries which were colonised, administered or which have had a significant colonial legacy from Britain.

Source: Institute of Commonwealth Studies (2007)

Notes: See Appendix 2.1 for a full list of countries.

Label: Brcol

Linguistic Data

Description: Proportion of the population speaking either English (Engfrac) or Western European (Eurfrac) languages as their mother tongue.

Source: In the first instance, data was sourced from Hall and Jones (1999). This data set, however, excluded a number of Pacific Island countries which are large recipients of Australian aid. Data was collected from a variety of sources including the Pacific Regional Information System (PRISM) and the CIA World Fact Book Country Pages.

Notes: As discussed, this paper uses two language variables: the fraction of a country's population speaking one of the five primary Western European languages (including English) as a mother tongue, and the fraction speaking English as a mother tongue. This

allows English and the other European languages to have separate impacts. Additions include:

Country	Engfrac	Eurfrac
Cook Is.	1	1
Marshall Is.	0.95	0.96
Micronesia	0.95	0.96
Nauru	1	1
Niue	0.95	0.95
Samoa	0.95	0.951
Tonga	0.989	0.99
Tuvalu	0.9	0.9

Rule of Law Index

Description: This index is one of six indices developed to measure governance. The authors draw 194 different measures from 17 different sources of subjective governance data constructed by 15 different organisations. These sources include international organisations, political and business risk rating agencies, think tanks and non governmental organisations. The Rule of Law Index combines several indicators that measure the extent to which agents have confidence in and abide by the rules of society. These include perceptions of the incidence of both violent and non violent crime, the effectiveness and predictability of the judiciary, and the enforceability of contracts. Together, these indicators measure the success of a society in developing an environment in which fair and predictable rules form the basis for economic and social interactions. The component indicators are aggregated using an unobserved components model that expresses the observed data in each cluster as a linear function of the unobserved common component of governance, plus a disturbance term capturing perception errors and/or sampling variation in each indicator. The choice of units for governance ensures that the estimates of governance have a mean of zero, a standard deviation of one, and a range of –2.5 to 2.5. A higher positive value indicates greater rule of law.

Source: In the first instance data was sourced from World Bank (2008a). This version of the data set, however, excluded a number of Pacific Island countries which are large recipients of Australian aid. For these countries data was collected directly from Kaufmann, Kraay and Mastruzzi (2003).

Notes: Following this data collection exercise data was still not available for eight of the micro-Pacific Island states of Nauru, Niue, New Caledonia, Northern Marianas, Palau,

Tokelau, Tuvalu, and Wallis and Futuna. Each of these countries had their rule of law index set to zero. Each set of estimations was carried out excluding these countries rather than setting their rule index to zero and the results remained comparatively similar.

Label: Rule

Appendix 2.3: Goodness of Fit Measures for Continuous Dependent Variable Tobit Models

One issue which has typically not been discussed within the aid allocation literature is how to interpret the goodness of fit of the model when applying the Tobit estimation method. Whilst R^2 values are not directly attainable in Maximum Likelihood Estimations (MLE), pseudo-R^2 values are reported in most econometric software. For the present case the continuous nature of the dependent variable does however pose some additional problems. The method for calculating the discrete outcomes pseudo-R^2 in MLE estimations is based on the formula one minus the ratio of the full model log likelihood (LLR_1) and constant only log likelihood (LLR_0).[138] This can be written formally as:

$$\text{Pseudo-}R^2 = 1 - (LLR_1/LLR_0)$$

Given that for discrete outcomes the log likelihood is the log of a probability, and must therefore always be negative, this measure satisfies the requirement of being bound by 0 and 1. For continuous dependent variable outcomes, however, the log likelihood is the log of a density function. Since these density functions can be greater than 1 (for example, the normal density at 0), the log likelihood can be either positive or negative (Sribney 1997). Thus it is possible that the formula given above could observe a pseudo-R^2 value greater than one.

An alternative approach for continuous dependent variable models such as that used in this paper is to calculate the pseudo-R^2 value as:

$$\text{Pseudo-}R^2 = 1 - \sigma/\ \sigma_0$$

Where given, the linear probability model sigma is calculated as:

$$A = c + X*B + \sigma *e$$

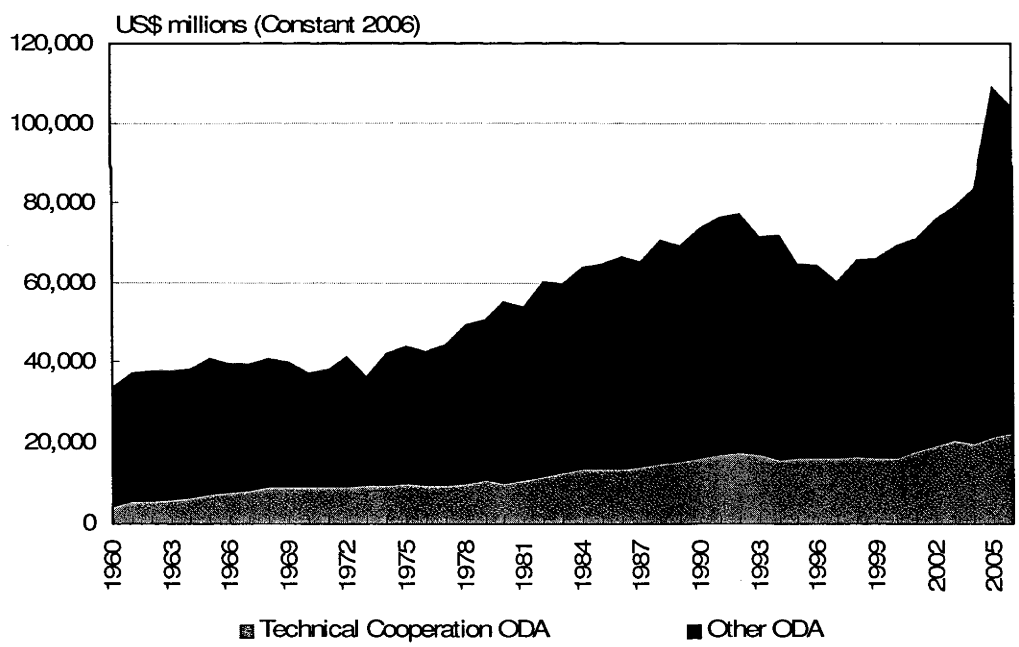
where A is the dependent aid variable, X is the vector of explanatory variables, beta is the vector of respective coefficients for each of the X, and e is the error term satisfying the typical assumptions. As a result, as more explanatory terms are added to the model the smaller the estimate of sigma becomes. As a result the pseudo R^2 value is constrained between zero and one. This approach is preferable to the method for discrete dependent

[138] This is, for example, the method used to calculate the pseudo-R^2 in STATA v.9.0.

variable estimations. The downside of this approach, however, is that this type of pseudo-R^2 value is not sufficiently robust for an accurate depiction of the proportion of variance of the response variable explained by the predictors (Zimmermann 1996:21).[139]

Rasmusen (2005), for instance, conducts a number of tests to highlight the fact that pseudo-R^2 values can in fact drastically understate the true explanatory power of a hypothesised model, concluding that 'if you just ran a Tobit regression, and looked at the R^2, you might think your regression was not explaining much of anything—but it is' (Rasmusen 2005:1). A potentially more appropriate manner for assessing the goodness of fit for continuous variable Tobit models suggested by Rasmusen (2005) is to simply re-estimate all of the Tobit model specifications using OLS and reporting the normal R^2 value. The approach taken in the following estimation is to report both the pseudo-R^2 values for continuous dependent variable models as well as the typical adjusted R^2 values from the OLS estimations.

Appendix 3.1: Chart 3.2—Technical Assistance ODA from OECD Donors to all Recipients (1966–2006)



Source: OECD DAC (2008).

[139] As the index developers advise, for instance, 'We do not intend that our pseudo-R^2 should be reported in formal write-ups of results. The idea of a pseudo-R^2 came from economists who wanted some rough measure of explanatory power of the model. So it's really just a guide for fitting models.' See http://www.stata.com/support/faqs/stat/wbl.html.

Appendix 3.2: Australian Bilateral Aid Recipients by Population

Country	Average Receipts 2003-2007	Population (2007)	Country	Average Receipts 2003-2007	Population (2007)
Afghanistan	23.33	32,738,376	Marshall Islands*	0.80	58,316
Angola	0.47	16,948,673	Mexico	0.05	105,280,515
Bangladesh	19.17	158,571,814	Micronesia, Fed. *	1.47	110,961
Bhutan	0.91	657,401	Mongolia	1.86	2,608,412
Bosnia-Herz.	0.02	3,772,964	Mozambique	2.37	21,372,202
Botswana	0.23	1,881,432	Myanmar	9.24	48,782,825
Brazil	0.40	191,601,284	Namibia	0.08	2,080,083
Cambodia	26.81	14,446,056	Nauru*	14.91	9,258
Central Afr. Rep.	0.84	4,343,405	Nepal	3.48	28,107,592
Chad	1.71	10,763,638	Niger	0.09	14,195,085
Chile	0.06	16,594,596	Nigeria	0.33	147,982,941
China	37.10	1,318,309,724	Niue*	1.51	1,444
Colombia	0.70	43,987,000	Pakistan	12.90	162,481,399
Congo, Dem. Rep.	1.04	62,399,224	Palau*	0.65	20,162
Cook Islands*	1.89	19,569	Palestinian Adm.	5.35	3,800,000
Côte d'Ivoire	0.01	19,268,303	PNG*	241.68	6,324,097
Croatia	0.35	4,435,982	Peru	0.21	27,898,182
Ecuador	0.03	13,339,580	Philippines	45.72	87,892,094
Egypt	7.98	75,466,539	Rwanda	0.27	9,735,541
El Salvador	0.03	6,853,143	Samoa*	12.08	181,293
Eritrea	0.36	4,841,773	Senegal	0.06	12,411,094
Ethiopia	2.01	79,086,894	Serbia	0.30	7,381,579
Fiji*	17.93	834,278	Sierra Leone	0.15	5,848,320
Ghana	0.21	23,461,523	Solomon Islands*	132.49	495,362
Guatemala	0.06	13,348,222	Somalia	1.39	8,695,928
Haiti*	0.15	9,611,554	South Africa	5.64	47,850,700
Honduras	0.13	7,103,786	Sri Lanka	21.82	20,010,000
India	7.95	1,124,786,997	Sudan	13.68	38,555,569
Indonesia	190.51	225,630,065	Swaziland	0.24	1,147,616
Iran	0.92	71,021,039	Tanzania	1.31	40,432,163
Iraq	134.33	28,221,180	Thailand	6.81	63,832,135
Jordan	0.03	5,718,855	Timor-Leste*	46.31	1,061,129
Kenya	0.97	37,530,726	Tokelau*	1.04	1,433
Kiribati*	6.19	95,067	Tonga*	8.22	102,214
Korea, Dem. Rep.	3.65	23,782,802	Tuvalu*	2.85	12,177
Laos	13.33	5,859,891	Uganda	1.44	30,916,072
Lebanon	3.71	4,097,076	Uruguay	0.01	3,323,906
Lesotho	0.26	2,005,826	Vanuatu*	19.45	225,898
Madagascar	0.01	19,669,953	Viet Nam	50.15	85,154,900
Malawi	1.48	13,920,062	Zambia	0.76	11,919,870
Malaysia	1.28	26,549,518	Zimbabwe	2.13	13,402,661
Maldives*	1.76	305,340	Bilateral, unspecified	263.29	-

Source: OECD DAC (2008), World Bank (2008) and UN DESA (2008). * Member of the SIDS Grouping.

Appendix 3.3: List of Countries Included as Fragile States

Country	Start Date	End Date	Country	Start Date	End Date
Albania	1991*	1995	Madagascar	1977	1991
Angola	1989*	2005	Mauritania	1977	2005
Bangladesh	1977	2000	Mozambique	1985	2005
Benin	1977	2002	Myanmar	1985	1995*
Burkina Faso	1983	1994	Nepal	1977	2003
Burundi	1977	1988	Nicaragua	1977	1996
Burundi	1995	2005	Niger	1989	2005
Cambodia	1988*	2005	Nigeria	1985	2005
Central African Rep.	1977	2005	Pakistan	1977	1990
Chad	1977	2005	Papua New Guinea**	2003	2005
Comoros	1978*	2005	Rwanda	1994	2003
Congo, Dem. Rep.	1977	2005	Sao Tome and Principe	1981	2005
Congo, Rep.	1977	2005	Sierra Leone	1977	2005
Côte d'Ivoire	1988	2000	Solomon Islands	1989	2003*
Egypt	1985	2000	Somalia	1980	2005
Equatorial Guinea	1980*	2005	Sri Lanka	1977	2005
Ethiopia	1977	2000	Sudan	1979	2005
Ghana	1977	1987	Tajikistan	1995*	2003
Guinea	1977	2005	Tanzania	1981	2000
Guinea-Bissau	1992	2005	Togo	1978	1987
Guyana	1982	1996	Turkmenistan	1996*	2005
Haiti	1977	2005	Uganda	1985	1998
Honduras	1985	1995	Ukraine	1997	2003
Indonesia	1977	1987	Uzbekistan	1997	2005
Laos	1978*	2005	Vietnam	1978*	1991
Lesotho	1982	1998	Zambia	1980	2000
Liberia	1985	2005	Zimbabwe	2001	2005

* Data starts or ends at that date. Unless otherwise indicated, data starts in 1977 and ends in 2005.
** Papua New Guinea added as a fragile state since 2003.
Source: Chauvet and Collier (2007).

Appendix 3.4: Data Sources and Descriptions for Chapter 3

Aid Data (1980–2004)

Description: ODA receipts as defined in Appendix 2.2.

Source: OECD DAC (2008).

Label: ODA/GDP

Technical Assistance Data (1980–2004)

Technical Assistance (or Cooperation) ODA is defined by OECD DAC (2007) as the provision of know-how in the form of personnel, training, research and associated costs. This includes donor-financed activities that augment the level of knowledge, skills, technical know-how or productive aptitudes of people in developing countries; and services such as consultancies, technical support or the provision of know-how that contributes to the execution of a capital project. Technical cooperation also includes both free-standing technical cooperation and technical cooperation that is embedded in investment programs (or included in program-based approaches).

Source: OECD DAC (2008).

Notes: Measured in Constant 2000 US$.

Label: TechGDP

GDP Per Capita Growth and GDP Per Capita Data (1980–2004)

Description: GDP and GDP per capita as defined in Appendix 2.2.

Source: Heston, Summers and Aten (2006) and ADB (2008).

Label: GDP and GDPpc

Distance Data

Description: Great circle distance between capital cities.

Source: Byers (2007).

Notes: The great circle distance is the shortest distance between any two points on the surface of a sphere measured along a path on the surface of the sphere (as opposed to going through the sphere's interior).

Label: Dist

Population Data

Description: Total population as defined in Appendix 2.2.

Source: Heston, Summers and Aten (2006) and ADB (2008).

Label: Pop

British Colony Data

Description: Those countries which were colonised, administered or who have had a significant colonial legacy from Britain as defined by the Institute of Commonwealth Studies.

Source: Institute of Commonwealth Studies (2007).

Notes: See Appendix 2.1for a full list of countries.

Label: Brcol

Population within 100 km of Major Waterways

Description: Proportion of the population which lives within 100 kilometres of an ocean or major waterway.

Source: In the first instance, data was sourced from Rodrik et al. (2004). However, this data set excluded a number of small Pacific Island countries such as Cook Islands, Nauru, Niue, Solomon Islands, Tokelau, Tuvalu, Kiribati and Micronesia.

Notes: Given their small geographic size, all of these countries were assumed to have 100 per cent of their population within 100 km of the ocean.

Label: Pop100km

Distance from the Equator

Description: Distance of a country's capital city from the equator.

Source: In the first instance data was sourced from Rodrik et al. (2004). However, this data set excluded a number of Pacific Island countries which are large recipients of Australian aid. Data was collected on the basis of comparison with other Pacific Island countries.

Notes: The Solomon Islands, Tuvalu, Tokelau, Nauru and Kiribati were assumed to be the same distance from the equator as PNG. Samoa and the Cook Islands were assumed to be as distant as Vanuatu whilst Niue and Tonga were deemed comparable with Fiji.

Label: Disteq

Appendix 3.5: Table 3.3: Sample Countries with Population Less than 5 Million—Mean Values

Country	GE	Pop	GDPpc	Disteq	Pop100km	Fragile*	ODAGDP	Tech GDP	Aus ODAGDP
Albania	-0.583	3,516	4,274	41	0.880	0	1.693	0.552	0.0000
Armenia	0.000	3,314	4,766	40	0.000	0	1.092	0.649	0.0000
Bosnia-Herzegovina	-0.900	3,977	3,491	43	1.000	0	4.749	0.928	0.0000
Botswana	0.600	1,561	7,267	24	0.000	0	0.617	0.329	0.0035
C.Afr. Rep.	-1.430	3,524	880	4	0.000	1	3.807	1.083	0.0000
Congo, Rep.	-1.313	2,779	1,759	4	0.183	1	2.958	0.583	0.0000
Costa Rica	0.430	3,735	8,138	9	1.000	0	0.243	0.146	0.0000
Croatia	0.450	4,523	9,816	45	0.476	0	0.259	0.123	0.0002
Eritrea	-1.000	4,458	604	15	0.662	0	7.342	1.289	0.0291
Fiji$^{\psi}$	-0.190	837	4,810	18	1.000	0	1.082	0.713	0.310
Gabon	-0.589	1,223	10,914	0	0.469	0	0.710	0.264	0.0000
Gambia	-0.538	1,347	885	13	0.624	0	3.276	1.388	0.0019
Georgia	-0.700	4,926	4,757	41	0.314	0	0.881	0.520	0.0000
Guinea-Bissau	-1.138	1,263	607	11	0.812	1	10.664	3.894	0.0000
Jamaica	-0.020	2,657	4,584	18	1.000	0	0.811	0.312	0.0001
Jordan	0.120	4,683	3,874	31	0.219	0	2.132	0.705	0.0003
Kiribati$^{\psi}$	-0.340	93	1,393	1	1.000	0	13.310	7.084	4.2715
Kuwait	0.267	1,765	29,092	29	0.964	0	0.006	0.006	0.0000
Laos	-0.100	4,971	1,409	17	0.099	1	2.616	0.963	0.1784
Lebanon	-0.333	3,678	5,924	33	1.000	0	0.838	0.296	0.0007
Lesotho	-0.125	1,840	1,801	29	0.000	0	2.011	0.733	0.0092
Liberia	-1.788	2,860	387	6	1.000	1	13.727	2.118	0.0008
Madagascar	-0.300	2,063	5,252	18	0.471	0	2.253	0.719	0.0000
Mauritania	-0.063	2,637	1,463	18	0.149	1	5.407	1.110	0.0012
Mauritius	0.489	1,180	14,974	20	1.000	0	0.209	0.121	0.0070
Micronesia$^{\psi}$	-0.420	108	3,836	29	1.000	0	26.532	1.709	0.2461
Mongolia	-0.325	2,584	1,497	47	0.000	0	3.268	1.572	0.0413
Namibia	0.288	1,802	5,082	22	0.047	0	1.559	0.702	0.0072
Nauru$^{\psi}$	-1.171	12	6,307	2	1.000	0	0.011	0.001	0.0088
Nicaragua	-0.633	4,652	3,313	12	0.752	1	3.235	0.768	0.0002
Oman	0.588	2,497	16,340	23	0.492	0	0.112	0.042	0.0000
Panama	0.038	2,813	7,731	8	1.000	0	0.207	0.139	0.0000
PNG$^{\psi}$	-0.460	4,690	4,385	9	1.000	0	1.547	0.529	1.1697
Samoa$^{\psi}$	0.200	180	3,115	13	1.000	0	6.148	3.662	1.6241
Sierra Leone	-1.000	4,752	830	8	0.568	1	2.489	0.566	0.0017
Slovenia	1.050	1,936	20,209	46	0.598	0	0.155	0.016	0.0000
Solomon Islands$^{\psi}$	-1.200	473	2,081	9	1.000	1	5.606	3.176	2.5881
Togo	-0.750	4,675	883	6	0.417	0	2.657	0.721	0.0002
Tonga$^{\psi}$	-0.480	103	3,285	41.5	1.000	0	7.244	4.430	2.0991
Trinidad and Tobago	0.275	1,127	13,241	10	1.000	0	0.084	0.038	0.0000
Turkmenistan	-1.400	4,776	7,342	37	0.000	1	0.063	0.041	0.0001
Uruguay	0.500	3,346	10,199	34	0.725	0	0.096	0.064	0.0000
Vanuatu$^{\psi}$	-0.500	191	3,021	16	1.000	0	5.765	3.919	1.9563

Countries with at least one observation recorded as a fragile state. For a full list of years during which a country is deemed as fragile, see Appendix 3.2. $^{\psi}$ Pacific Island Countries. Note: AusODAGDP refers to Australian ODA as a proportion of GDP. Other variables are as defined above.

Appendix 3.6: A Truncated Table of Critical F-Statistics to Test for Weak Instruments in Linear IV Regression. Based on Stock and Yogo (2002) and extended in Batten and Martina (2006).

The Stock and Yogo (2002) weak instruments test rejects an instrument for a 2SLS estimation, if its estimated first stage F-Statistic is smaller than the critical value indicated in the table below. This critical value, g_{min}, is calculated as a function of the number of included endogenous regressors (n), the number of instrumental variables (K_2) and the desired maximal size (r = 0.15) of a Wald test of $\beta = \beta_0$, when the significance level is 5 per cent. The table below, taken from Stock and Yogo (2002:59) and which is then extended to the n = 3 and n = 4 case (using the Gauss computer program provided by Motohiro Yogo and extended and run by Professor Heather Anderson to generate the relevant critical values), reports these critical g_{min} values.

Critical F-Statistics to Test for Weak Instruments

	n = 2, r =		n = 3, r =		n = 4, r =	
	0.1	0.15	0.1	0.15	0.1	0.15
K_2						
1	-	-	-	-	-	-
2	6.91	4.59	-	-	-	-
3	13.32	8.17	4.23	3.34	-	-
4	16.75	9.92	10	6.48	3.25	3.19
5	19.35	11.21	13.4	8.23	6.68	4.79
6	21.59	12.31	15.98	9.54	10.05	6.54
7	23.63	13.32	18.16	10.64	12.61	7.87
8	25.58	14.28	20.11	11.61	14.73	8.97
9	27.44	15.22	21.9	12.52	16.59	9.9
10	29.28	16.13	23.61	13.38	18.22	10.76
11	31.07	17.03	25.24	14.2	19.78	11.54
12	32.85	17.92	26.82	15.01	21.2	12.27

The full table, covering many more values of K_2, is available upon request.

Appendix 4.1: Table 4.1: PNG and Other Melanesia Social Welfare Outcomes

	PNG		Fiji		Solomon Is.		Vanuatu	
	Initial	*Current*	*Initial*	*Current*	*Initial*	*Current*	*Initial*	*Current*
Fixed line and mobile phone subscribers (per 100 people) (1983 vs. 2005)	**0.8**	**2.3**	4.1	38.2	0.6	2.8	1.3	9.1
Health expenditure per capita (current US$) (2000 vs. 2005)	**25**	**34**	82	148	40	28	49	67
Immunisation, DPT (% of children aged 12–23 months) (1980 vs. 2006)	**32**	**75**	68	81	46	91	22	85
Incidence of tuberculosis (per 100,000 people) (1990 vs. 2006)	**250**	**250**	42	22	292	135	94	58
Life expectancy at birth, total (years) (1977 vs. 2006)	**49**	**57**	63	69	58	63	57	70
Mortality rate, infant (per 1,000 live births) (1975 vs. 2006)	**97**	**54**	41	16	98Ψ	55	92	30
School enrolment, primary (% gross) (1991 vs. 2006)	**65**	**55**	133	100	88	100℘	95	108
Proportion of population on less than US$1 a day (1996 vs. 2005)	**25**	**40**	26	35π	-	23	-	26Ω

Source: World Bank World Development Indicators 2008. *Initial* represents earliest possible available data. *Current* represents latest possible available data. Ψ Data for 1985. ℘ Data for 2005. π Data for 2003. Ω Data for 1998. Poverty income data is sourced from AusAID (2008a).

Appendix 5.1: Data Collection Method for Chapter 5[140]

In order to obtain a complete time series of PNG's fiscal data, a number of data sources were used. On the government revenue side, data was sourced from a number of documents containing budget actuals data in order to obtain a complete time series for the period from a consistent source. Having said this it is important to note that government spending as recorded through the national budget documents does not include expenditures made by a number of publicly owned utilities and some regulatory agencies which obtain a significant amount of self financing through levying their own fees and charges. In so far, as this study is concerned primarily with how the flow of grant aid has influenced the expenditure priorities and fiscal behaviour of the national government this is only a minor limitation. However, this does mean that the study relies on the assumption that the behaviour of these self funding institutions is weakly exogenous to the broader behaviour of the national government. Further, whilst the budget actual figures are the most accurate data available for many years they remain a record of what was allocated to each of these priorities by government and not what was actually spent. It has only been during recent years that the divergences between government allocations and dispersions have been reliably reported. These budget actuals data were sourced from the following sources for the corresponding years.

Table 5.15: Sources for Government Revenue and Grant Data

Document	Years of Budget Actuals Covered
World Bank (1977)	1970–72
Sims and Daniel (1986)	1972–82
Stein (1991)	1983–86
1993 Budget	1987–91
1995 Budget	1992–94
1997 Budget	1995
1998 Budget	1996–97
2000 Budget	1998
2004 Budget	1999–2001
2007 Budget	2002
2008 Budget	2003-2008

In terms of expenditure, between 1974 and 2002 expenditure allocations were made in accordance with the IMF Government Financial Statistics Database. In this case, expenditure was classified into five categories. These included health, education, law and order, infrastructure, and other. The classifications used from the IMF database to allocate these expenditures are shown below.

[140] Grateful acknowledgement is given to staff from the PNG Department of Treasury and Finance who assisted in compiling the data sources, many of which are not easily obtainable, and in defining certain expenditure classifications.

Table 5.16: Categorisation of IMF GFS Data into Expenditure Categories

Category	IMF GFS Code (Table 7)	
1. Health	11. Health	
2. Education	13. Education	
3. Law and Order	4. Public order and safety	
4. Infrastructure	6. Agriculture, forestry, fishing and hunting	7. Fuel and energy
	8. Mining, manufacturing and construction	9. Transport
5. General	8. Recreation, culture, and religion	6. Housing and community amenities
	2a. Public Debt Transactions	10. Social Welfare and Protection
	3. Defence	11. Other Non Allocated Expenditures
	5e. Other Economic Affairs and Services	2b. General public services (less Public debt transactions)

The most recent 2008 version of the IMF database only covers up to 2002. As a result, another data collection effort was undertaken decomposing recent government expenditures into each of the five classifications listed above. This involved allocating expenditures from both the recurrent and development budgets.

Recurrent expenditures were allocated according to Volume II, Part 1, Table 2 of the budget which calculates recurrent expenditures on a functional basis. These expenditures were first allocated according to the IMF categories and then allocated into each of the five expenditure categories as shown in Table 16.

Table 5.17: Allocation of Recurrent Budget Expenditures to IMF Classifications

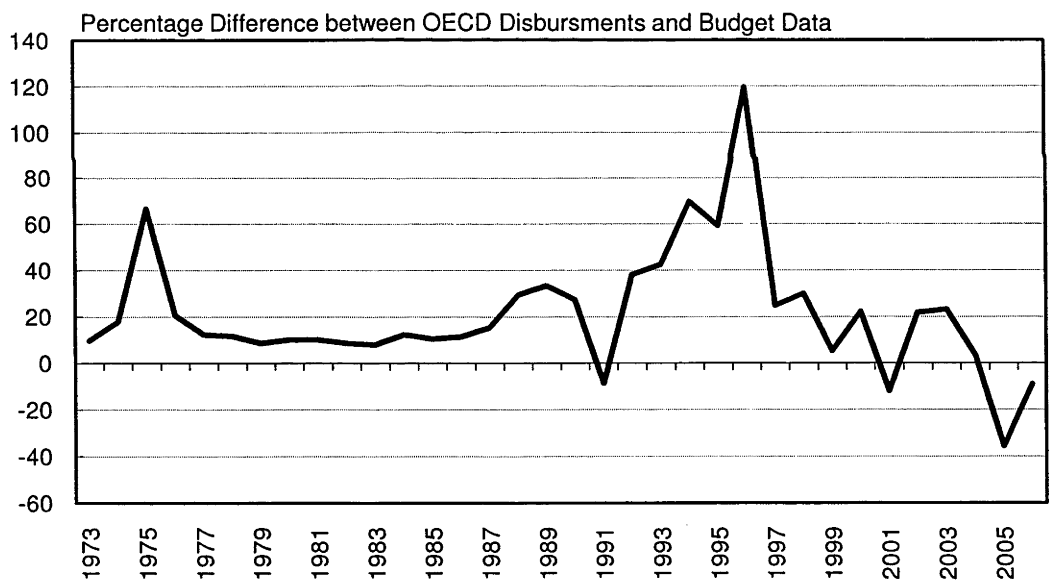
IMF Classification	Budget Volume II, Part 1, Table 2 Classification Code
General public services	**11, 13, 14, 15, 19, 41, 51, 52, 53**
Public debt transactions	51, 52, 53
General public services (less Public debt transactions)	**11, 13, 14, 15, 19, 41**
Defence	**18**
Public order and safety	**17**
Economic affairs	**12, 31, 32, 33, 34, 35, 36, 39**
Agriculture, forestry, fishing and hunting	31
Fuel and energy	33
Mining, manufacturing and construction	35
Transport and communications	36
Other economic affairs	12, 32, 34, 39
Housing and community amenities	**24, 25**
Health	**22**
Recreation, culture and religion	**27, 28**
Education	**16, 21**
Social protection	**23**
Other expenditure	**42**

Development budget expenditures are not calculated on a functional basis. This component of the budget was allocated to each of the five categories through departmental allocations from both the National Department and Statutory Authority Tables from Volume II, Part 1, Section III of the budget documents. The following allocation rules were used.

Table 5.18: Allocation of Development Budget Expenditures

Category	National Department (N) or Statutory Authority (S)
1. Health	240: Dept of Health (N)
	241: Hospital Management Services (N)
	519: National AIDS Secretariat (S)
	520: Institute of Medical Research (S)
2. Education	235: Dept of Education (N)
	236: Commission for Higher Education (N)
	512: Uni PNG (S)
	513: Uni Tech (S)
	514: Uni Goroka (S)
	515: Uni Vudal (S)
3. Law and Order	226: Dept of Corrective and Institutional Services (N)
	228: Dept of Police (N)
	223: Judiciary Services (N)
4. Infrastructure	258: Dept of Information and Communication (N)
	259: Dept of Transport (N)
	264: Dept of Works and Implementation (N)
	540: Water and Sewerage Board (S)
	567: National Road Authority (S)
5. General	All Remaining National Department and Statutory Authority Development Budget Expenditures

Appendix 5.2: Chart 5.2: Difference between OECD Disbursement and Budget Grant Data



Source: OECD DAC (2008) and author's calculations (see Appendix 5.1).

Appendix 5.3: Additional Tables for Chapter 5

Table 5.3: Selection Order Criteria for Model I

Selection Order Criteria		
lag	**AIC**	**HQIC**
0	18.469	18.770
1	18.108	18.651
2	17.580*	18.606*
3	18.252	19.036

Table 5.4: Cointegration Tests for Model I

Maximum Rank I	H^0: Number of Cointegrating Vectors (v)	Trace Statistic	95% Critical Value	Eigenvalue
0	None	46.547*	47.21	.
1	At most 1	21.928	29.68	0.536
2	At most 2	10.168	15.41	0.307

*denotes rejection of the null hypothesis that there are *r* cointegrating vectors at 5 per cent significance level.

Table 5.7: Selection Order Criteria for Model II

Lag	**AIC**	**HQIC**
0	24.159	24.3926
1	21.660	21.785
2	17.595*	18.219*
3	17.947	19.076

Table 5.8: Cointegration Tests for Model II

Maximum Rank	H^0: Number of Cointegrating Vectors (v)	Trace Statistic	95% Critical Value
0	None	64.998*	68.52
1	At most 1	39.132	47.21
2	At most 2	20.828	29.68
3	At most 3	6.673	15.41

* Rejection of the null hypothesis at a 95 per cent confidence level.

Table 5.11: Selection Order Criteria for Model III

lag	**AIC**	**HQIC**
0	27.917	28.197
1	21.745	23.707*
2	21.190	24.833
3	19.489*	24.814

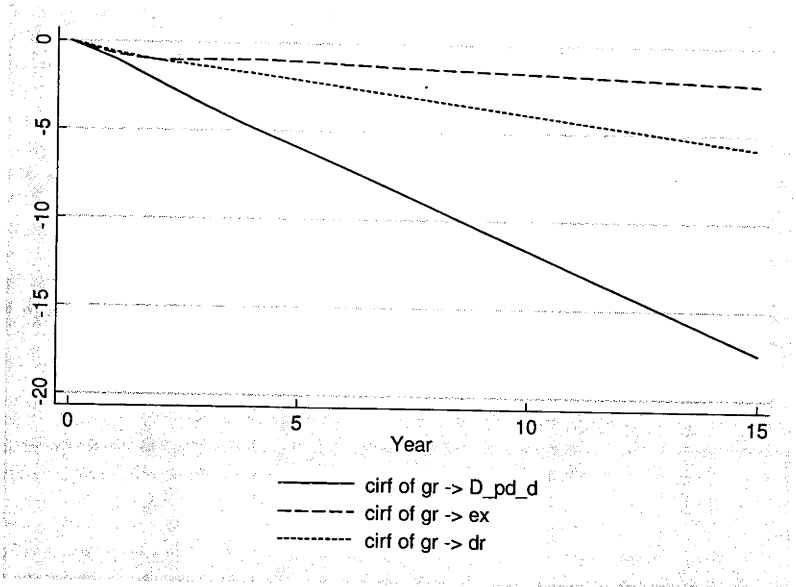
Table 5.12: Cointegration Tests for Model III

Maximum Rank	Number of Cointegrating Vectors (v)	Trace Statistic	95 % Critical Value
0	None	77.580*	94.15
1	At most 1	49.746	68.52
2	At most 2	29.269	47.21
3	At most 3	16.7014	29.68

* Rejection of the null hypothesis at a 95 per cent confidence level.

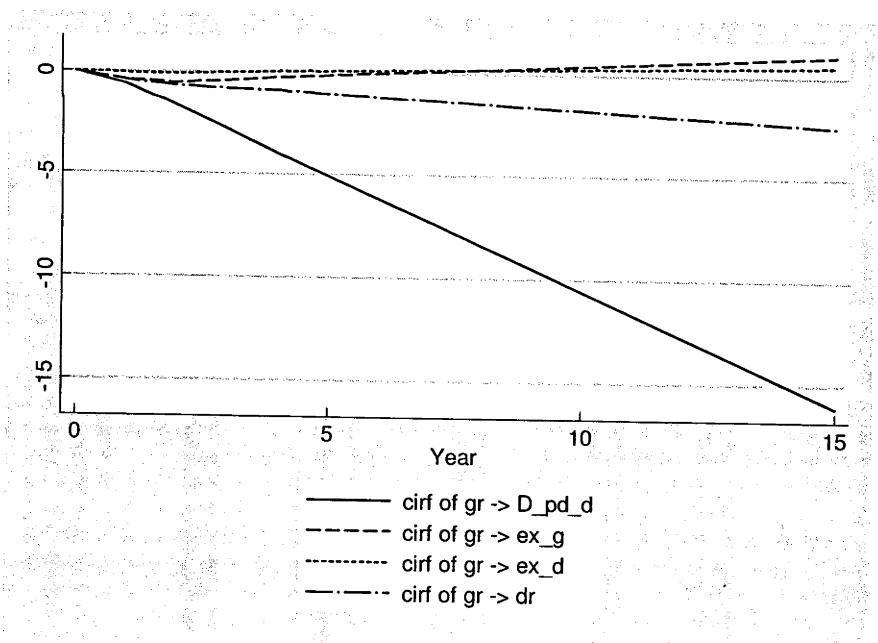
Appendix 5.4: Additional Charts for Chapter 5

Chart 5.2: Model I Cumulative IRF—Domestic Borrowing, Domestic Revenue and Expenditure Levels



Source: Author's calculations.

Chart 5.4: Model II Cumulative IRF—Domestic Borrowing, Domestic Revenue and Expenditure Composition



Source: Author's calculations.

Appendix 5.5: Summary of Results

	Domestic Revenue	Domestic Borrowing	Expenditure	Development Expenditure	General Expenditure
Model I	Negative	Negative	Negative		
Model II	Negative	Negative		Nil	Nil
Model III					
Budget Support	Negative	Negative		Positive	Negative
Project and Program Aid	Nil	Positive		Negative	Positive

Notes: Results show long run results from the IRF's once all flow on effects between each of the endogenous variables have stabilised. See text for a discussion of the comparitive size of each one of these effects.

Appendix 6.1: Categorisation of IMF GFS and OECD DAC Databases

Category	OECD DAC Code		IMF GFS Code (Table 7)	
1. Health	120: I.2 Health 130: I.3 Population Programmes		11. Health	
2. Education	110: I.1 Education		13. Education	
3. Infrastructure	140: I.4 Water Supply and Sanitation	210: II.1 Transport and Storage	7. Fuel and Energy	8. Mining, Manufacturing and Construction
	220:II.2 Communications	230: II.3 Energy	9. Transport	10. Housing and Community amenities
4. General	160: I.6 Other Social Infrastructure and Services	150: I.5 Government and Civil Society	2a. Public Debt Transactions	4. Public Order and Safety
	920: X. Support to NGOs	930: XI. Refugees in Donor Countries	2b. General Public Services (less Public Debt Transactions)	5e. Other Economic Affairs and Services
	310: III.1 Agriculture - Forestry - Fishing, Total	410: IV.1 General Environment Protection	8. Recreation, Culture and Religion	6. Agriculture, Forestry, Fishing and Hunting
	430: IV.3 Other Multi-sector	700: VIII. Emergency Assistance and Reconstruction	3. Defence	10. Social Welfare and Protection
	240: II.4 Banking and Financial Services	250: II.5 Business and Other Services	11. Other Non Allocated Expenditures	
	320: III.2 Industry - Mining - Construction	331: III.3 Trade Policy and Regulations		
	332: III.4 Tourism			
	600: VII. Action Relating to Debt	998: XII. Unallocated/ Unspecified		
	910: IX. Administrative Costs of Donors			
5. Budget Support	510: VI.1 General Budget Support	520: VI.2 Developmental Food Aid/Food Security Assistance		
	530: VI.3 Other Commodity Assistance			

Appendix 6.2: Summary of Results

	Domestic Revenue	Education Expenditure	Health Expenditure	Infrastructure Expenditure	General Expenditure
ODA	Negative	Positive	Positive	Positive	Positive
Budget Support	Positive	Positive	Positive	Positive	Positive
Sector Specific ODA	-	Positive	Negative	Positive	Positive
Other ODA	Negative	Negative	Negative	Positive	Positive

Notes: As defined in the text, sector specific ODA refers to project and program aid targetted at each of the specific sectors listed in the top row. Other ODA refers all resicual project and program aid, whilst budget support is untied financial assistance. ODA refers to the net effect of the three types of aid. See text for an explanation of the comparative size of each one of these effects.

References

Acemoglu, D., Johnson, S. and Robinson, J., 2001. 'The colonial origins of comparative development: an empirical investigation', *The American Economic Review*, 91(5):1369–401.

ABS, 2001. *Year Book Australia Document No. 1301.0*, Australian Bureau of Statistics, Canberra. Available from http://www.abs.gov.au (accessed 15 July 2007).

ADB, Various years 1995–2008. *Economic Trends and Prospects in Developing Asia: Papua New Guinea*, Asian Development Bank Outlook, Manila. Available from http://www.adb.org/documents.asp (accessed 20 June 2008).

——, 2003. *Development of a Sector Wide Approach in the Health Sector of Papua New Guinea: final report*, Report No. 4057-PNG, Asian Development Bank, Manila.

——, 2007. *Key Indicators Database: country profiles*, Asian Development Bank, Manila. Available from www.adb.org (accessed 20 February 2008).

Alesina, A. and Dollar, D., 2000. 'Who gives foreign aid to whom and why?', *Journal of Economic Growth*, 5(1):33–63.

Alpers, P., 2005. *Gun-running in Papua New Guinea: from arrows to assault weapons in the Southern Highlands*, Special Report, Small Arms Survey Publication, Geneva.

Anderson, E., 2007. *Aid allocation and the MDGs*, ODI Briefing Paper No. 19, Overseas Development Institute, London.

Arellano, M. and Bond, S., 1991. 'Some tests of specification for panel data: Montecarlo evidence and an application to employment equation', *Review of Economic Studies*, 58(2): 277–97.

——, and Bover, O., 1995. 'Another look at the instrumental variable estimation of error-components models', *Journal of Econometrics*, 68(1):29–51.

Armstrong, H., de Kervenoael, R., Li, X. and Read, R., 1998. 'A comparison of the economic performance of different micro states, and between micro states and larger countries', *World Development*, 26(4):639–56.

——, and Read, R., 2002. 'The phantom of liberty? economic growth and the vulnerability of small states', *Journal of International Development*, 14(4):435–58.

ASPI, 2003. *Our Failing Neighbour*, Australian Strategic Policy Institute, Canberra. Available from www.aspi.org.au (accessed 20 September 2008).

——, 2004. *Strengthening Our Neighbour: Australia and the future of Papua New Guinea*, Australian Strategic Policy Institute, Canberra. Available from www.aspi.org.au (accessed 20 September 2008).

AusAID, 2003a. *The contribution of Australian aid to Papua New Guinea's development, 1975–2000*, Provisional Conclusions from a Rapid Assessment, Evaluation and Review Series, No. 34, AusAID, Canberra.

——, 2003b. *Counter-terrorism and Australian aid*, Special Publication, AusAID, Canberra.

——, 2005. *Fragile states: what is international experience telling us?*, AusAID, Canberra. Available from http://www.ausaid.gov.au/publications/pdf/fragile_states.pdf (accessed 20 October 2007).

——, 2006. *Papua New Guinea – Australia Development Cooperation Strategy 2006–2010*, Executive Summary Document, AusAID, Canberra. Available from http://www.ausaid.gov.au/publications/pdf/png_execsum.pdf (accessed 14 March 2008).

——, 2006. *Australian aid: promoting growth and stability*, White Paper on the Australian Government's Overseas Aid Program, AusAID, Canberra.

——, 2007. *New approaches to aid delivery*, AusAID, Canberra. Available from http://www.ausaid.gov.au/country/png/mechanisms.cfm (accessed 12 January 2009).

——, 2008a. *Tracking Development and Governance in the Pacific*, AusAID, Canberra.

——, 2008b. *Port Moresby declaration*, Press Release by AusAID, Canberra. Available from http://www.ausaid.gov.au/country/PortMorDec.cfm (accessed 5 October 2008).

——, 2009. *Accra: smarter aid, better results*, AusAID, Canberra. Available from http://www.ausaid.gov.au/ode/accra.cfm (accessed 12 February 2009).

Baker, R., 1992. *Public Administration in Small and Island States*, Kumarian Press, West Hertford.

Batten, A., 2008. *PNG fiscal policy since independence*, Paper prepared for the National Development Summit, National Research Institute, Port Moresby.

——, Duncan, R. and Gouy, J., 2009. 'Papua New Guinea in 2009: from boom to gloom?', *Pacific Economic Bulletin*, 24(1):1–26.

Bauer, P., 1966. 'Foreign aid: an instrument for progress', in B. Ward and P. T. Bauer (eds), *Two Views on Aid to Developing Countries,* Institute of Economic Affairs, Occasional Paper 9, London.

——, 1971. *Dissent on Development: studies and debates in development economics*, Weidenfeld and Nicholson Publishing, London.

Baum, C., Schaffer, M. and Stillman, S., 2003. *Instrumental variables and GMM: estimation and testing*, Boston College Working Paper No. 545, Boston.

Berthelemy, J., 2006. 'Bilateral donors' interest vs. recipients' development motives in aid allocation: do all donors behave the same?', *Review of Development Economics*, 10(2):179–94.

——, and Tichet, A., 2004. 'Bilateral donors' aid allocation decisions: a three dimensional panel analysis', *International Review of Economics and Finance*, 13(3):253–74.

Bertram, G., 1993. 'Sustainability, aid, and material welfare in small South Pacific Island economies (1900–1990)', *World Development*, 21(2):247–58.

Bidani, B. and Ravallion, M., 1997. 'Decomposing social indicators using distributional data', *Journal of Econometrics*, 77(1):125–39.

Binh, T. and McGillivray, M., 1993. 'Foreign aid, taxes and public investment: a comment', *Journal of Development Economics*, 41(1):173–76.

Bleaney, M., Gemmell, N. and Kneller, R., 2001. 'Testing the endogenous growth model: public expenditure, taxation and growth over the long run', *Canadian Journal of Economics*, 34(1):36–57.

Blundell, R. and Bond, S., 1998. 'Initial conditions and moment restrictions in dynamic panel data models', *Journal of Econometrics*, 87(1):115–43.

Boone, P., 1995. *Politics and the effectiveness of foreign aid*, Discussion Paper No. 272, Centre for Economic Performance, London School of Economics, London.

Bowman, C., 2005. *The Papua New Guinea Kina's Fear of Floating*, Asia Pacific School of Economics and Government, Australian National University, Canberra.

——, and Chand, S., 2007. *Size matters: the impact of aid on institutions*, United Nations WIDER Working Paper No. 2007/25, United Nations University, Helsinki.

BPNG, 1978. *Annual Report*, Bank of Papua New Guinea, Port Moresby.

——, 1997, 1999, 2000, 2006, and 2007. *December Quarterly Economic Bulletin*, Bank of Papua New Guinea, Port Moresby.

——, 1998. *Money and Banking in Papua New Guinea*, Bank of Papua New Guinea, Port Moresby.

——, 2007. *Money and Banking in Papua New Guinea* (updated edition), Bank of Papua New Guinea, Port Moresby.

Bourguignon, F. and Sundberg, M., 2006. *Constraints to achieving the MDGs with scaled-up aid*, DESA Working Paper No. 15, United Nations, New York.

Brautigam, D., 1999. *Aid Dependence and Governance*, Expert Group on Development Issues, Almqvist and Wiksell International, Stockholm.

——, and Knack, S., 2004. 'Foreign aid, institutions, and governance in Sub-Saharan Africa', *Economic Development and Cultural Change*, 52(2):255–85.

Briguglio, L., 1995. 'Small island developing states and their economic vulnerabilities', *World Development*, 23(9):1615–32.

Brown, O., 2005. *Aiding or Abetting? Dilemma's of foreign aid and political instability in Melanesia Pacific*, International Institute for Sustainable Development, Winnipeg.

Bruno, M. and Easterly, W., 1998. 'Inflation crises and long-run growth', *Journal of Monetary Economics*, 41(1):3–26.

Burnside, C. and Dollar, D., 2000. 'Aid policies and growth', *American Economic Review*, 90(4):847–68.

——, and ——, 2004. *Aid, policies and growth: revisiting the evidence*, Policy Research Working Paper No. 2834, World Bank, Washington.

Byers, J., 2007. *Great Circle Distance Calculator*. Available from http://www.chemical-ecology.net/java/lat-long.html (accessed 20 May 2007).

Callick, R., Hughes, H., Vincent, D. and Weisman, E., 1990. *The Papua New Guinea Handbook*, National Centre for Development Studies, Canberra.

Cammack, D., 2008. *Chronic poverty in Papua New Guinea*, Background Paper for the Chronic Poverty Report 2008–09, Chronic Poverty Research Centre, London.

Canavire, G., Nunnenkamp, P., Thiele, R. and Triveño, L., 2005. *Assessing the allocation of aid: developmental concerns and the self-interest of donors*, Working Paper No. 1253, Kiel Institute for World Economics, Kiel.

Cashel-Cordo, P. and Craig, S., 1990. 'The public spending impact of international resource transfers', *Journal of Development Economics*, 32(1):17–42.

Chand, S., 2002. Deficit bias, debt accumulation, and economic crises in Papua New Guinea, Crawford School of Economics and Government, Australian National University, Canberra (unpublished).

——, 2003. 'Economic trends in the Pacific Island countries', *Pacific Economic Bulletin*, 18(1):1–15.

——, 2004. Impact of revamped Australian assistance to the island Pacific, Paper presented at the Sixth Annual Global Development Conference, Dakar, 24–26 January (unpublished).

——, 2006. Economic growth in Forum Island countries: lessons of the past decade and challenges and opportunities ahead, Keynote Paper on Economic Growth_for the 2006 Forum Economic Ministers Meeting, Honiara, 4 July (unpublished).

Chang, C., Fernandez-Arias, E. and Serven, L., 1998. *Measuring aid flows: a new approach*, Working Paper No. 387, Inter-American Development Bank, Washington.

Chauvet, L. and Collier, P., 2007. *Education in fragile states*, Paper commissioned for the Education for All Global Monitoring Report 2008, United Nations Educational, Scientific and Cultural Organisation, New York.

——, and Guillaumont, P., 2001. 'Aid and performance: a reassessment', *Journal of Development Studies*, 37(6):66–92.

Chenery, H. and Strout, A., 1966. 'Foreign assistance and economic development', American Economic Review, 56(4):679–733.

Cirillo, S., 2006. *Australia's governance aid: evaluating norms and objectives*, Working Paper No. 06-01, Crawford School of Economics and Government, Australian National University, Canberra.

Clemens, M. and Radelet, S., 2003. *The millennium challenge account: how much is too much, how long is long enough?*, Working Paper No. 23, Centre for Global Development, Washington.

——, ——, and Bhavnani, R., 2004. *Counting chickens when they hatch: the short-term effect of aid on growth*, Working Paper No. 44, Center for Global Development, Washington.

Cogneau, D. and Naudet, J., 2004. *Who deserves aid? equality of opportunity, international aid and poverty reduction*, November Working paper, Dévelopment, Institutions et Analyses de Long Terme, Paris.

Collier, P. and Dehn, J., 2001. *Aid, shocks and growth*, World Bank Development Research Group Working Paper 2688, World Bank, Washington.

——, and Dollar, D., 1999. Aid, risk and special concerns of small states, Paper presented at the Conference on Small States, St Lucia, 17-19 February (unpublished).

——, and ——, 2001. 'Aid, risk, and the special concerns of small states', in D. Peretz, R. Faruqi, and E. Kisanga (eds), *Small States in the Global Economy*, Commonwealth Secretariat and The World Bank, London.

——, and ——, 2002 'Aid allocation and poverty reduction', *European Economic Review*, 46(8):1470–500.

——, and Chauvet, L., 2008. 'Aid and reform in failing states', *Asian-Pacific Economic Literature*, 22(1):15–24.

Connell, J., 1997. *Papua New Guinea: the struggle for development*, Routledge Press, Melbourne.

Coviello, D. and Islam, D., 2006. *Does aid help improve economic institutions*, World Bank Policy Research Working Paper 3990, World Bank, Washington.

Curtin, T., 2001. Could have done better: an update on economic developments in PNG since 1995. Available from www.geocities.com/CapitolHill/Senate/1103/better.htm (accessed 20 June 2008) (unpublished).

Davis, T., 2006. Governance and uncertainty: the public policy of Australia's official development assistance to Papua New Guinea, PhD Thesis, Department of Political Science, University of Melbourne, Melbourne.

Dalgaard, C., and Hansen, H., 2001. 'On aid growth and good policies', *Journal of Development Studies*, 37(6):17–41.

——, ——, and Tarp, F., 2004. 'On the empirics of foreign aid and growth', *The Economic Journal*, 114(496):191–216.

Deolalikar, A., 2005. *Attaining the Millennium Development Goals in India*, Oxford University Press, New Delhi.

Devrajan, S., and Swaroop, V., 1998. The Implications of Foreign Aid Fungibility for Development Assistance, Development Research Group, World Bank, Washington, (unpublished).

Devrajan, S., Rajkumar, A. and Swaroop, V., 1999. *What does aid to Africa finance?*, World Bank Policy Research Working Papers, No. 2092, World Bank, Washington D.C.

Dibb, P., 2000. 'The strategic environment in the Asia-Pacific region', in R. Blackwill and P. Dibb (eds), *America's Asian Alliances*, MIT Press, Cambridge, MA.

Dinnen, S., 2004. *Lending a fist: Australia's new interventionism in the southwest Pacific*, Discussion Paper 04/05, State Society and Governance in Melanesia Program, Australian National University, Canberra.

Djankov, S., Montalvo, J. and Reynal-Querol, M., 2008. 'The curse of aid', *Journal of Economic Growth*, 13(3):169–94.

Dolado, J., Gonzalo, J. and Marmol, F., 2001. 'Cointegration', in B. Baltagi (ed.), *A Companion to Theoretical Econometrics*, Blackwell Publishing, New York.

Dollar, D. and Levin, V., 2004. *The increasing selectivity of foreign aid: 1984-2002*, World Bank Policy Research Working Paper 3299, World Bank, Washington.

——, and ——, 2005. *The forgotten states: aid volumes and volatility in difficult partnership countries (1992–2002)*, Summary Paper Prepared for DAC Learning and Advisory Process on Difficult Partnerships, Organisation for Economic Cooperation and Development, Paris.

Domar, E., 1947. 'Capital expansion, rate of growth and employment', *Econometrica*, 14(2):137–47.

Dorney, S., 1998. *The Sandline Affair: politics and mercenaries and the Bougainville Crisis*, Australian Broadcasting Corporation, Sydney.

——, 2005. *Papua New Guinea: what can Australia do (successfully)?*, Australian Security in the 21st Century Seminar Series, Parliament House, Canberra, 11 October, 2005. Available from http://australianetwork.com/news/infocus/s1497903.htm (accessed 12 January 2009).

Downer, A., 2006. *Launch of the Australian aid white paper*, in AIIA Policy Commentary, Australian Institute of International Affairs, July 2006, Canberra.

——, 2007. Speech for the Biennial Sir Arthur Tange Lecture on Australian Diplomacy 8th August 2007, Canberra. Available from http://www.foreignminister.gov.au/speeches/2005/050808_tange.html (accessed 27 August 2007).

Drazen, A., 2002. *Conditionality and ownership in IMF lending: a political economy approach*, Paper prepared for the Second Annual IMF Research Conference, Washington D.C., 29–30 November 2001.

Duncan, R., 1994. 'On achieving sound and stable economic policies in the Pacific Islands', *Pacific Economic Bulletin*, 9(1):21–5.

——, 2002. *Structural adjustment programs: the roles of the IMF and the World Bank*, Paper prepared for Kumul Scholars International Conference, Asia Pacific School of Economics and Government, Canberra.

——, and Chand, S., 2002. 'The economics of the "Arc of Instability"', *Asian-Pacific Economic Literature*, 16(1):1–9.

Easterly, W., 2002. 'The cartel of good intentions: the problem of bureaucracy in foreign aid', *Journal of Policy Reform*, 5(4):223–50.

——, 2003. 'Can foreign aid buy growth?', *Journal of Economic Perspectives*, 17(3):23–48.

——, 2006. *The White Man's Burden: why the West's efforts to aid the rest have done so much ill and so little good*, Oxford University Press, Oxford.

——, and Kraay, A., 2000. 'Small states, small problems? income, growth and volatility in small states', *World Development*, 28(11):2013–27.

——, and Rebelo, S., 1993. 'Fiscal policy and economic growth: an empirical investigation', *Journal of Monetary Economics*, 32(3):417–58.

Ehrlich, S., Kiszewski, A., Malaney, P., Mellinger, A., Sachs, J. and Spielman, A., 2004. 'A global index representing the stability of malaria transmission', *American Journal of Tropical Medicine and Hygiene*, 70(5):486–98.

Elbadawi, I., Kaltani, L. and Schmidt-Hebbel, K., 2007. *Post-conflict aid, real exchange rate adjustment, and catch-up growth*, World Bank Policy Research Working Paper 4187, World Bank, Washington D.C.

Enders, W., 2003. *Applied Econometric Time Series*, 2nd Edition, John Wiley and Sons, New York.

Engle, R. and Granger, C., 1987. 'Co-integration and error correction: representation, estimation, and testing', *Econometrica*, 55(2):251–76.

Faal, E., 2007. *Political Budget Cycles in Papua New Guinea*, IMF Working Paper No. 07219, International Monetary Fund, Washington DC.

Fagernäs, S. and Roberts, J., 2004a. *The fiscal effects of aid in Zambia*, ODI Working Paper 10, Overseas Development Institute, London.

——, and ——, 2004b. *Fiscal impact of aid: a survey of issues and synthesis of country studies of Malawi, Uganda and Zambia*, Draft Working Paper, Overseas Development Institute, London.

——, and Schurich, C., 2004. *The fiscal effects of aid in Malawi*, ODI Working Paper 7, Overseas Development Institute, London.

Fallon, J., 1992. *The Papua New Guinean Economy: prospects for recovery, reform and sustained growth*, Australian International Development Assistance Bureau, Australian Government Printing Services, Canberra.

Farrugia, C., 1993. 'The special working environment of senior administrators in small states', *World Development*, 21(2):221–6.

Feeny, S., 2003. 'The impact of foreign aid on poverty and human well-being in Papua New Guinea', *Asia-Pacific Development Journal*, 10(2):73–93.

——, 2005a. 'Effective aid to the Pacific: big challenges in small states', *WIDER Angle*, 1 June 2005, Geneva.

——, 2005b. *The impact of foreign aid on the rural sector in Melanesia*, Report prepared for AusAID. Available from http://www.ausaid.gov.au/publications (accessed 30 June 2005).

——, 2006. 'Policy preferences in fiscal response studies', *Journal of International Development*, 18(8):1167–75.

——, 2007. 'Foreign aid and fiscal governance in Melanesia', *World Development*, 35(3):439–53.

——, and Rogers, M., 2007. *Public sector efficiency and small island developing states*, Research Paper No. 2007/46, UNU WIDER, Geneva.

——, and ——, 2008. 'Public sector efficiency, foreign aid and small island developing states', *Journal of International Development*, 20(4):526–46.

Feyzioglu, T., Swaroop, V. and Zhu, M., 1998. 'A panel data analysis of the fungibility of foreign aid', *World Bank Economic Review*, 12(1):29–58.

Filmer, D. and Pritchett, L. 1999. 'The impact of public spending on health: does money matter', *Social Science and Medicine*, 49(1):1309–23.

Fischer, S., 1993. 'The role of macroeconomic factors in growth', *Journal of Monetary Economics*, 32(3):485–512.

Foster, G., 1986. *Financial Statement Analysis*, 2nd edition, Prentice Hall, Englewood Cliffs.

Franco-Rodriguez, S., 2000. 'Recent advances in fiscal response models with an application to Costa Rica', *Journal of International Development*, 12(3):429–42.

——, McGillivray, M. and Morrissey, O., 1998. 'Aid and the public sector in Pakistan: evidence with endogenous aid', *World Development*, 26(7):1241–50.

Gallup, J., Mellinger, A. and Sachs, J., 1999. *Climate, water navigability and development*, Working Paper No. 24, Centre for International Development, Harvard University, Cambridge.

Gang, I. and Khan, H., 1991. 'Foreign aid, taxes and public investment', *Journal of Development Economics*, 24(2):355–69.

Gani, A., 2009. 'Health care financing and health outcomes in Pacific Island countries', *Health Policy and Planning*, 24(1):72–81.

Garnaut, R. and Baxter, P., 1983. *Exchange Rate and Macro-Economic Policy in Independent Papua New Guinea,* Government Printing Service, Port Moresby.

Ghai, Y., 1990. *Public Administration and Management in Small States: Pacific experiences*, The Commonwealth Secretariat and the University of the South Pacific, London.

Gibson, C., Andersson, K., Ostrom, E. and Shivakumar, S., 2005. *The Samaritan's Dilemma: the political economy of development aid*, Oxford University Press, Oxford.

GoA, 1976. *Cabinet Minute: economic committee meeting decision no. 190*, 2 February 1976, Commonwealth Government of Australia, Canberra.

——, 1984. *Report of the Committee to Review the Australian Overseas Aid Program (Jackson Committee)*, Australian Commonwealth Government Publishing Service, Canberra.

——, 1997a. *One Clear Objective: poverty reduction through sustainable development (Simons Report)*, Report of the Committee of Review, AusAID, Canberra.

——, 1997b. *Better Aid for a better future: Seventh annual report to parliament on Australia's development cooperation program and the government's response to the Committee of Review of Australia's Overseas Aid Program,* Parliament House, Canberra.

GoPNG, various years. *National Budget Documents*, Department of Finance and Treasury, Government of Papua New Guinea, Port Moresby.

——, 1976. *National Development Strategy*, Department of National Planning and Development, Government of Papua New Guinea, Port Moresby.

——, 1985. *National Development Plan. the medium-term development program 1986–1990*, Department of National Planning and Development, Government of Papua New Guinea, Port Moresby.

——, 1996. *Medium Term Development Strategy 1997–2002*, National Planning Office, Government of Papua New Guinea, Port Moresby.

——, 2002. *Medium Term Fiscal Strategy 2002–2007*, Department of Finance and Treasury, Government of Papua New Guinea, Port Moresby.

——, 2005a. *Medium Term Debt Strategy (2007–2011)*, Department of Finance and Treasury, Government of Papua New Guinea, Port Moresby.

——, 2005b *Medium Term Development Strategy (2005–2010)*, Government of Papua New Guinea, Department of National Planning and Development, Port Moresby.

——, 2006. *Fiscal Responsibility Act 2006*, Department of Finance and Treasury, Government of Papua New Guinea, Port Moresby.

Gounder, R., 1994. 'Empirical results of aid motivations: Australia's bilateral aid program', *World Development*, 18(5):723–32.

——, 2001. 'Aid-growth nexus: empirical evidence from Fiji', *Applied Economics*, 33(8):1009–19.

——, 2002. 'Empirical evidence of the relationship between foreign aid and economic growth: the case of the Solomon Islands', in B. Arvin (ed.), *New Perspectives on Foreign Aid and Development*, Praeger, Westport.

——, and Doessel, D., 1997. 'Motivation models of Australia's bilateral aid program: the case of Indonesia', *Bulletin of Indonesian Economic Studies*, 33(3):97–110.

——, and Sen, K., 1999. 'What motivates foreign aid: a case study of Australia's aid to Indonesia', *The Journal of Developing Areas*, 33(3):379–93.

Granger, C., 1969. 'Investigating causal relationships by econometric models and cross spectrum methods', *Econometrica,* 37(3):434–48.

Griffen, K., 1970. 'Foreign capital, domestic savings and economic development', Bulletin of the Oxford University Institute of Economics and Statistics, 32(2):99–112.

——, and Enos, J., 1970. 'Foreign assistance: objectives and consequences', *Economic Development and Cultural Change*, 18(3):313–27.

Guillamont, P. and Chauvet, L., 2001. 'Aid and performance: a reassessment', *Journal of Development Studies*, 37(6):123–45.

Gujarati, D., 1995. *Basic Econometrics*, 3rd edition, McGraw-Hill, New York.

Gupta, S., Clements, S., Pivovarsky, P. and Tiongson, E., 2003. *Foreign aid and revenue response: Does the composition of aid matter?*, IMF Working Paper No. 03/176, IMF, Washington D.C.

——, Clements, B. and Inchauste, G., 2004. *Helping Countries Develop: the role of fiscal policy*, International Monetary Fund, New York.

——, Verhoeven, M. and Tiongson, E., 1999. *Does higher government spending buy better results in education and health care?*, IMF Working Paper No. 99/21, International Monetary Fund, Washington D.C.

Hall, R. and Jones, C., 1999. 'Why do some countries produce so much more output per worker than others?', *The Quarterly Journal of Economics*, 114(1):83–116.

Hamblin, W., 2006. Sector wide approaches: issues for Papua New Guinea, Presentation at Divine Word University Conference on Sector Wide Approaches, 10–11 February 2006, Madang (unpublished).

Hamilton, J., 1995. *Time Series Analysis*, Princeton University Press, New York.

Hansen, H. and Heady, D., 2007. *The short-run macroeconomic impact of foreign aid to small states: an agnostic time series analysis*, Research Paper No. 2007/38, UNU WIDER, Geneva.

Hansen, H. and Tarp, F., 2000. 'Aid effectiveness disputed', *Journal of International Development*, 12(3):375–98.

——, and ——, 2001. 'Aid and growth regressions', *Journal of Development Economics*, 64(2):547–70.

Harrod, R., 1939. 'Essay in dynamic theory', *The Economic Journal*, 49(193):14–33.

Harrod, R., 1948. *Towards a Dynamic Economics*, Macmillan and Co. Publishing, London.

Heckman, J., 1976. 'The common structure of statistical models of truncation, sample selection and limited dependent variables and a simple estimator for such models', *Annals of Economic and Social Measurement*, 5(4):475–92.

Heckelman, J. and Knack, S., 2005. *Foreign aid and market liberalising reform*, World Bank Policy Research Policy Working Paper No. WPS3557, World Bank, New York.

Hegarty, D. and King, P., 1983. 'Papua New Guinea in 1982: the election brings change', *Asian Survey*, 23(2):217–26.

Heinecke, D., Dollery, B. and Fleming, E., 2008. 'The samaritan's dilemma: the effectiveness of Australian foreign aid to Papua New Guinea', *Australian Journal of International Affairs*, 62(1):53–71.

Heller, P., 1975. 'A model of public fiscal behaviour in developing countries: aid, investment, and taxation', *The American Economic Review*, 65(3):429–45.

——, 2005. *Pity the Finance Minister: managing a substantial scaling-up of aid flows*, Fiscal Affairs Department, International Monetary Fund, Washington D.C.

——, and Gupta, S., 2002. *Challenges in expanding development assistance*, IMF Discussion Paper PDP/02/5, International Monetary Fund, Washington D.C.

Heritage Foundation, 2006. *Governance Indicators*, Heritage Foundation, Washington D.C. Available from www.heritage.org (accessed 10 December 2007).

Heston, A., Summers, R. and Aten, B., 2006. *Penn World Table Version 6.2*, Center for International Comparisons of Production, Income and Prices at the University of Pennsylvania, Pennsylvania.

Hinchliffe, K., 1980. 'Conflicts between national aims in Papua New Guinea: the case of decentralization and equality', *Economic Development and Cultural Change*, 28(4):819–38.

Hjertholm, P. and White, H., 2004. *Survey of foreign aid: history, trends and allocation*, University of Copenhagen Working Paper No.00-04, University of Copenhagen, Copenhagen.

Hojman, D., 1996. 'Economic and other determinants of infant and child mortality in small developing countries: the case of Central America and Caribbean', *Applied Economics*, 28(3):281–90.

Holmqvist, G., 2000. *Fungibility parameters: a comment on their reliability and policy implications from an aid practitioner*, Paper presented at the SIDA conference on Aid and Development, 20–21 January, Stockholm.

Hughes, H., 2003. *Aid has failed the Pacific*, Issue Analysis Paper 33, Centre for Independent Studies, Sydney.

——, and Windybank, S., 2005. *Papua New Guinea's choice: a tale of two nations,* Issue Analysis Paper 58, Centre for Independent Studies, Sydney.

Imbun, B., 2005. 'A lot of talking and no significant economic progress: a review of wage policy in Papua New Guinea', *The Journal of Pacific Studies*, 28(2):218–45.

IMF, 1995. *IMF approves stand-by credit for Papua New Guinea*, Press Release No. 95/40, 14 July 1995, International Monetary Fund, Washington D.C.

——, 1998. *Papua New Guinea: recent economic developments*, IMF Staff Country Report No. 98/10, International Monetary Fund, Washington D.C.

——, 2000. *Letter of intent for standby loan facility arrangement between Mr Stanley Fischer and Mr Mekere Morouta*, Port Moresby, 20 March. Available from http://www.imf.org/external/NP/LOI/2000/png/01 (accessed 15 July 2008).

——, 2008. *Government Financial Statistics Database*, International Monetary Fund, Washington D.C. Available from www.imf.org (accessed 12 January 2008).

Institute of Commonwealth Studies, 2007. *ICS library: former British administered countries and commonwealth countries*, London. Available from http://commonwealth.sas.ac.uk (accessed 20 May 2007).

Islam, M., 2003. 'Political regimes and the effects of foreign aid on economic growth', *Journal of Developing Areas*, 37(1):35–53.

Jacobs, B., 1975. 'Administrative problems of small countries', in P. Selwyn (ed.), *Development Policy in Small Countries*, Croom Helm, London.

Jarque, C. and Bera, A., 1980. 'Efficient tests for normality, homoscedasticity and serial independence of regression residuals', *Economics Letters*, 6(3):255–9.

Johansen, S., 1988. 'Statistical analysis of cointegrating vectors', *Journal of Economic Dynamics and Control*, 12(2):231–54.

Johansen, S., 1991. 'Estimation and hypothesis testing of cointegrating vectors in Gaussian Vector Autoregressive models', *Econometrica*, 59(6):1551–80.

——, 1994. 'The role of the constant and linear terms in cointegration analysis of nonstationary variables', *Econometric Reviews*, 13(2):205–29.

—— and Juselius, K., 1990. 'Maximum likelihood estimation and inference on cointegration, with applications to the demand for money', *Oxford Bulletin of Economics and Statistics*, 52(2):169–210.

Jones, S., Riddel, R. and Kotonglou, K., 2004. *Aid allocation: managing for development results and difficult partnerships*, Summary paper prepared for the DAC Learning and Advisory Process on Difficult Partnerships, Oxford Policy Management, Oxford.

Kanbur, R., 2003. *The economics of international aid*, in C. Kolm and J. Ythier (eds), *Handbook of Giving, Reciprocity and Altruism*, North-Holland Publishing, Netherlands.

Kang, J., 2005. *Usefulness and uselessness of the decomposition of Tobit coefficients*, Paper presented at the annual meeting of the American Sociological Association, Philadelphia.

Kaufmann, D., Kraay, A. and Mastruzzi, M., 2003. *Governance matters III: governance indicators for 1996–2002*, World Bank Policy Research Working Paper 3106, World Bank, Washington D.C.

——, ——, and ——, 2007. *Governance matters VI: governance indicators for 1996–2006*, World Bank Policy Research, Washington D.C.

——, ——, and Zoido-Lobaton, P., 1999a. *Governance matters,* World Bank Policy Research Working Paper 2196, World Bank, Washington D.C. Available from www.worldbank.org/wbi/gac (accessed 20 October 2007).

——, ——, and ——, 1999b. *Aggregating governance indicators*, World Bank Policy Research Working Paper 2195, World Bank, Washington D.C. Available from www.worldbank.org/wbi/gac (accessed 20 October 2007).

Kennedy, P., 2003. *A Guide to Econometrics*, 5th Edition, MIT Press, Cambridge Massachusetts.

Khan, H. and Hoshino, E., 1992. 'Impact of foreign aid on the fiscal behaviour of LDC governments', *World Development*, 20(10):1481–8.

Khiliji, N. and Zampelli, E., 1991. 'The fungibility of US assistance to developing countries and the impacts on recipient expenditures: a case study of Pakistan', *World Development*, 19(8):1095–106.

——, and ——, 1994. 'The fungibility of US military and non-military assistance and the impacts on expenditures of major aid recipients', *Journal of Development Economics*, 43(2):345–62.

Kilby, C., 2005. 'Aid and regulation', *The Quarterly Review of Economics and Finance*, 45(2):325–45.

Kim, K. and Moody, P., 1992. 'More resources better health? a cross-national perspective', *Social Science and Medicine*, 34(8):837–42.

King, T. and Sugden, C., 1996. *The Economy of Papua New Guinea*, AusAID International Development Issues No. 46, National Capital Printing, Canberra.

Knack, S., 1999. *Aid dependence and the quality of governance: a cross-country empirical analysis*, World Bank Working Paper No. 2396, World Bank, Washington D.C.

Kotoglou, K. and Jones, S., 2005. *Aid orphans and darlings: comparing actual global aid allocation to "poverty efficient" allocation*, Consultant Report prepared by Oxford Policy Management, Oxford.

Lawford, S., 2004. *Finite-sample quantiles of the Jarque-Bera test*, Economics and Finance Discussion Papers 04-03, Economics and Finance Section, School of Social Sciences, Brunel University, London.

Leibenstein, H., 1950. 'Bandwagon, Snob and Veblen effects in the theory of consumers' demand', *Quarterly Journal of Economics*, 64(2):183–207.

Lensink, R. and White, H., 2001. 'Assessing aid: a manifesto for aid in the 21st century?', *Oxford Development Studies*, 28(1):5–18.

Lepani, C., Morris, A. and Tuioti, E., 2004. *Joint review of the Australian aid program to Papua New Guinea*, Final Report, 31 August, Government Printer, Port Moresby.

Levy, V., 1988. 'Aid and growth in Sub-Saharan Africa: the recent experience', *European Economic Review*, 32(9):1777–95.

Liiv, T., 2002. 'Small states and bureaucracy: challenges for public administration', *Trames*, 6(4):374–89.

Lim, D., 1987. *The spending and taxing behaviour of governments of resource rich countries: a study of Papua New Guinea*, Discussion Paper No. 28, Institute of National Affairs, Port Moresby.

Long, J., 1997. *Regression Models for Categorical and Limited Dependent Variables*, Sage Publications, California.

Lowe, D., 2005. 'Brave new liberal: Percy Spender', *Australian Journal of Politics and History*, 51(3):389–99.

Lutkepohl, H., 1991. *Introduction to Multiple Time Series Analysis*, Springer Verlag, Berlin.

MacDonald, R., 2008. *Safety, security and accessible justice: participatory approaches to law and justice in Papua New Guinea*, Pacific Islands Policy No. 3, East-West Centre, Hawaii.

Maddala, G. and Kim, I., 1998. *Unit Roots, Cointegration, and Structural Change*, Cambridge University Press, Cambridge.

Maizels, A. and Nissanke, M., 1984. 'Motivations for aid to developing countries', *World Development*, 12(9):879–900.

Manning, M., 2005. 'PNG thirty years on', *Pacific Economic Bulletin*, 20(1):145–58.

Marshall, S., 2008. 'Calls to review aid as Rudd heads to PNG', ABC News, 6 March. Available from www.abc.net.au/news/stories/2008/03/06/2181416.htm (accessed 23 July 2008).

Martina, A. and Batten, A., 2007. 'Diseases dominate', in W. Garside (ed.), *Institutions and Market Economics*, Palgrave Macmillan Press, New York.

Masono, R., 2006. *Government capacity and citizen expectations in Bougainville: the impact of political autonomy*, Discussion Paper No. 06-08, Crawford School of Economics and Government, Australian National University, Canberra.

Mavrotas, G., 2002. 'Foreign aid and fiscal response: does aid disaggregation matter?', *Weltwirtschaftliches Archiv*, 138(3):534–59.

Mawuli, A., 1997. *Macroeconomic Crisis and Structural Reforms in Papua New Guinea*, National Centre for Development Studies, Australian National University, Canberra.

May, R., 2001. *From Promise to Crisis: a political economy of Papua New Guinea*, ANU EPress, Australian National University, Canberra.

——, 2006. 'Papua New Guinea: disorderly democracy or dysfunctional state', in D. Rumley, V. Forbes and C. Griffen (eds), *Australia's Arc of Instability: the political and cultural dynamics of regional stability*, Springer Press, Melbourne.

McDonald, J. and Moffitt, R., 1980. 'The uses of Tobit analysis', *The Review of Economics and Statistics*, 62(2):318–21.

McGillivray, M., 2000. 'Aid and public sector fiscal behaviour in developing countries', *Review of Development Economics*, 4(2):156–63.

——, 2003a. 'Modelling aid allocation: issues, approaches and results', *Journal of Economic Development*, 28(1):171–88.

——, 2003b. *Aid effectiveness and selectivity: integrating multiple objectives into aid allocations,* Paper presented at the Joint OECD Development Assistance Committee—Development Centre Experts' Seminar, 10 March, OECD Headquarters, Paris.

——, 2005. *Aid allocation and fragile states*, Background Paper for the Senior Level Forum on Development Effectiveness in Fragile States 13–14 January 2005, Lancaster House, London.

——, and Ahmed, A., 1999. 'Aid, adjustment and the public sector in the Philippines', *Journal of the Asia-Pacific Economy*, 4(2):381–91.

—— and Morrissey, O., 2000. 'Aid fungibility in assessing aid: red herring or true concern?', *Journal of International Development*, 12(3):413–28.

——, and ——, 2001a. *A review of evidence of the fiscal effects of aid*, CREDIT Research Paper, No. 01/13, Centre for Research in Economic Development and International Trade, University of Nottingham, Nottingham.

——, and ——, 2001b. 'Aid illusion and public sector fiscal behaviour', *Journal of Development Studies*, 37(6):118–36.

——, Naude, W. and Santos-Paulino, A., 2008. 'Small island states development challenges: introduction', *Journal of International Development*, 20(4):481–5.

——, and Ouattara, B., 2005). 'Aid, debt burden and government fiscal behaviour in Cote d'Ivoire', *Journal of African Economies*, 14(2):247–69.

McKinlay, R. and Little, R., 1977. 'A foreign policy model of US bilateral aid allocation', *World Politics*, 30(1):58–86.

Montmarquette, C. and Dudley, L., 1976. 'A model of the supply of bilateral foreign aid', *The American Economic Review*, 66(1):132–42.

Morauta, M., 2005. 'The PNG–Australia relationship', *Pacific Economic Bulletin*, 20(1):159–61.

Moreira, S., 2005. 'Evaluating the impact of foreign aid on economic growth: a cross-country study', *Journal of Economic Development*, 30(2):25–49.

Mosley, P., Hudson, J. and Horrel, S., 1987. 'Aid, the public sector and the market in less developed countries', *The Economic Journal*, 97(2):616–41.

——, ——, and Verschoor, A., 2004. 'Aid, poverty reduction and the new conditionality', *Economic Journal*, 114(496):217–43.

Moss, T., Pettersson, G. and van de Walle, N., 2006. *An aid–institutions paradox? a review essay on aid dependency and state building in Sub-Saharan Africa*, Working Paper No. 74, Center for Global Development, Washington D.C.

Mullen, J., 1999. 'Poverty perspectives of the DFID White Paper and the Australian aid review: implications for international training', *Public Administration and Development*, 19(1):31–9.

Musgrove, P., 1996. *Public and private roles in health: theory and financing patterns*, World Bank Discussion Paper No. 330, World Bank, Washington D.C.

Mwenda, A., 2006. *Foreign aid and the weakening of democratic accountability in Uganda*, Foreign Policy Briefing No. 88, Cato Institute, Washington D.C.

Nelson, H., 2008. *The Moti Affair in Papua New Guinea*, State Society and Governance in Melanesia Briefing Note No. 3, Australian National University, Canberra.

——, 1990. *Institutions, Economic Theory and Economic Performance*, Cambridge University Press, Cambridge.

——, 1994. 'Economic performance through time', *American Economic Review*, 84(3):359–68.

ODE, 2006. *FAQ on Paris Declaration and Aid Effectiveness*, Briefing Note, October 2006, Office of Development Effectiveness, AusAID, Canberra.

——, 2008a. *Office of Development Effectiveness Website*, AusAID. Available from http://www.ode.ausaid.gov.au/ (accessed 20 August 2008).

——, 2008b. *Annual Review of Development Effectiveness 2007*, Office of Development Effectiveness, AusAID, Canberra.

——, 2008c. *Economic Governance: annual thematic performance report 2006–07*, Office of Development Effectiveness, AusAID, Canberra.

ODI, 2008. *Aid effectiveness after Accra: how to reform the 'Paris agenda'*, ODI Briefing Note No. 39, Overseas Development Institute, London.

OECD, 1991. *Principles for new orientations in technical cooperation,* OECD Briefing Paper, Organisation for Economic Cooperation and Development, Paris.

——, 2005. *Paris declaration on aid effectiveness*, OECD High Level Forum, Organisation for Economic Cooperation and Development, 28 February–2 March, Paris.

——, 2005. *DAC PEER Review: Australia*, Organisation for Economic Cooperation and Development, Development Assistance Committee, Paris.

——, 2007. *Ensuring fragile states are not left behind*, Fact Sheet, December 2007, Organisation for Economic Cooperation and Development, Development Assistance Committee, Paris.

——, 2009. *DAC PEER Review: Australia*, Organisation for Economic Cooperation and Development, Development Assistance Committee, Paris.

OECD DAC, 2007. *Key Terms Glossary*, DAC Development Cooperation Directorate, Paris. Available from www.oecd.org (accessed 11 May 2008).

——, 2008, 2009. *International Development Statistics*, Organisation for Economic Cooperation and Development, Development Assistance Committee. Available from www.oecd.org/statisticsdata/ (accessed 1 January–30 June 2008).

Osei, R., Morrissey, O. and Lloyd, T., 2003. *Modelling the fiscal effects of aid: an impulse response analysis for Ghana*, CREDIT Research Paper No. 03/10, Centre for Research in Economic Development and International Trade, Nottingham.

Ouattara, B., 2006. 'Aid, debt and fiscal policies in Senegal', *Journal of International Development*, 18(8):1105–22.

Ovaska, T., 2003. 'The failure of development aid', *Cato Journal*, 23(2):175–88.

Pack, H. and Pack, J., 1990. 'Is foreign aid fungible? the case of Indonesia', *Economic Journal*, 100(399):188–94.

——, and ——, 1993. 'Foreign aid and the question of fungibility', *Review of Economics and Statistics*, 75(2):258–65.

Papenek, G., 1972. 'The effect of aid and other resource transfers on savings and growth in less developed countries', *Economic Journal*, 82(327):934–50.

——, 1973. 'Aid, foreign private investment, savings, and growth in less developed countries', *Journal of Political Economy*, 81(1):120–30.

Pavlov, V. and Sugden, C., 2006. 'Aid and growth in the Pacific Islands', *Asian-Pacific Economic Literature*, 20(2):38–55.

Pesaran, H. and Shin, Y., 1998. 'Generalized impulse response analysis in linear multivariate models', *Economics Letters*, 58(1):17–29.

Peterson, J., 2004. *Foreign sectoral aid fungibility, growth and poverty reduction*, Working Paper, Department of Economics, Stockholm University.

Powles, A., 2006. 'Mission creep: state building from Honiara to Dili', *Security Challenges*, 2(2):9–14.

Rajan, R. and Subramanian, A., 2005a. *What undermines aid's impact on growth?*, NBER Working Paper Series, No. 11657, National Bureau of Economic Research, Cambridge.

——, and ——, 2005b. *Aid and growth: what does the cross-country evidence really show?*, NBER Working Paper No. 11513, National Bureau of Economic Research, Cambridge.

Rajkumar, A. and Swaroop, V., 2002. *Public spending and outcomes: does governance matter?*, Policy Research Working Paper No. 2840, World Bank, Washington D.C.

Rasmusen, E., 2005. R^2 *and pseudo-*R^2 *commentary.* Available from http://www.rasmusen.org/x/2005/10/17/r2-and-pseudo-r2/ (accessed 10 January 2008).

Read, R., 2007. *Foreign direct investment in small island developing states*, WIDER Research Paper No. 2007/28, United Nations University, Geneva.

Reilly, B., 2000. 'Democracy, ethnic fragmentation, and internal conflict: confused theories, faulty data, and the "crucial case" of Papua New Guinea', *International Security*, 25(3):162–85.

——, 2004. 'State functioning and state failure in the South Pacific', *Australian Journal of International Affairs*, 58(4):479–93.

Rodrik, D., 1996. 'Understanding economic policy reform', *Journal of Economic Literature*, 34(1):9–41.

——, 2006. 'Goodbye Washington consensus, hello Washington confusion', *Journal of Economic Literature*, 44(4):973–87.

——, Subramanian, A. and Trebbi, F. 2004. 'Institutions rule: the primacy of institutions over geography and integration and economic development', *Journal of Economic Growth*, 9(2):131–65.

Rogerson, A., 2004. *The international aid system 2005–2010*, ODI Working Paper, Overseas Development Institute, London.

Roneck, D., 1992. 'Learning more from Tobit coefficients: extending a comparative analysis of political protests', *American Sociological Review*, 57(4):503–07.

Roodman, D., 2006. *How to do xtabond2 in STATA: an introduction to difference and system GMM in STATA*, Working Paper No. 103, Centre of Global Development, Washington.

——, 2007. 'The anarchy of numbers: aid, development, and cross-country empirics', *The World Bank Economic Review*, 21(2):255–77.

Rosenstein-Rodan, P., 1961. 'International aid for developing countries', *Review of Economics and Statistics*, 43(2):107–38.

Round, J. and Odedokun, M., 2004. 'Aid effort and its determinants', *International Review of Economics and Finance*, 13(3):293–309.

Sachs, J., 2003. *Institutions don't rule: direct effects of geography on per capita income*, NBER Working Paper No. 9490, National Bureau of Economic Research, Cambridge.

Saldanha, C., 2005. *Pacific 2020 background paper: political governance*, Australian Agency for International Development, Commonwealth Government of Australia, Canberra.

Shea, J., 1997. 'Instrument relevance in multivariate linear models: a simple measure', *Review of Economics and Statistics*, 79(2):348–52.

Sims, R. and Daniel, P. 1986. *Foreign Investment in Papua New Guinea: policies and practices*, National Centre for Development Studies, Australian National University, Canberra.

Singh, R., 1985. 'State intervention, foreign economic aid, savings and growth in LDCs: some recent evidence', *Kyklos*, 38(2):216–32.

Sribney, W., 1997. *Why is the pseudo-R2 for Tobit negative or greater than one?*, STATACorp Frequently Asked Questions Website. Available from www.stata.com/support/faqs/stat/pseudor2.html (accessed 12 May 2008).

Staiger, D. and Stock, J., 1994. *Instrumental variables regressions with weak instruments*, NBER Technical Working Paper No. 151, National Bureau of Economic Research, Cambridge.

Standish, B., 1999. *Papua New Guinea 1999: crisis of governance*, Research Paper No. 4, Foreign Affairs, Defence and Trade Group, Parliamentary Library of Australia, Canberra.

——, 2001. 'Papua New Guinea in 1999–2000', *Journal of Pacific History*, 36(3):285–98.

——, 2007. 'The dynamics of Papua New Guinea's democracy: an essay', *Pacific Economic Bulletin*, 22(1):135–57.

Stein, L., 1991. *Papua New Guinea: economic situation and outlook*, International Development Issues No.16, Australian Development Assistance Bureau, Canberra.

Stock, J. and Watson, M., 1993. 'A simple estimator of cointegrating vectors in higher order integrated systems', *Econometrica*, 61(4):783–20.

——, and Yogo, M. 2002. *Testing for weak instruments in linear IV regression*, NBER Technical Working Paper No. 284, National Bureau of Economic Research, Cambridge.

Streeton, P., 1993. 'The special problems of small countries', *World Development*, 21(2):197–202.

Sugema, I. and Chowdhury, A., 2005. 'Aid and fiscal behaviour in Indonesia: the case of a lazy government', CIES Discussion Paper No. 0506, Centre for International Economic Studies, South Australia.

Svensson, J., 2000. 'Foreign aid and rent-seeking', *Journal of International Economics*, 51(2):437–61.

Swaroop, V., Jha, S. and Rajkumar, A., 2000. 'Fiscal effects of foreign aid in a federal system of governance: the case of India', *Journal of Public Economics*, 77(3):307–30.

Tiwari, S., 2007. 'Putting money where the mouth is: does aid to Nepal finance what the donors say they want to finance?', *Himalayan Journal of Development and Democracy*, 2(1):1–15.

Tobin, J., 1958. 'Estimation of relationships for limited dependant variables', *Econometrica*, 26(1):24–36.

Todo, Y. and Kimura, H., 2007. *Is foreign aid a vanguard of FDI: a gravity equation approach*, RIETI Discussion Paper No. 07-E-007, Research Institute of Economy, Trade and Industry, Tokyo.

Tulip, R., 2005. *Historical perspectives on Australian aid to Papua New Guinea*, Paper presented to the PNG Canberra Students' Association Conference—'30 Years of Independence', Australian National University, 13 September, Canberra.

UN, 2000. *Resolution Adopted by the General Assembly 55/2*, United Nations Millennium Declaration Conference, Geneva.

——, 2008. *A Future Within Reach: Regional Partnership for Achieving the Millennium Development Goals in Asia and the Pacific*, Asia Pacific Study Series, United Nations, Bangkok.

UN DESA, 2008. *Small Islands Developing States Network*, Department for Economic and Social Affairs, United Nations, Geneva. Available from http://www.sidsnet.org/2.html (accessed 16 April 2008).

Van de Sijpe, N., 2007. *Is aid fungible? evidence from the education and health sectors*, CSAE Working Paper, Centre for the Study of African Economies, University of Oxford, Oxford.

Van de Walle, D., and Mu, R., 2007. 'Fungibility and the flypaper effect of project aid: micro-evidence for Vietnam', *Journal of Development Economics*, 84(2):667–85.

Warrington, E., 1994. 'Capacity for policy management: reappraising the context in micro states', *The Asian Journal of Public Administration*, 16(1):109–20.

Weisskopf, T., 1972. 'The impact of foreign capital inflow on domestic savings in underdeveloped countries', *Journal of International Economics*, 2(1):25–38.

White, H., 1994. 'Foreign aid, taxes and public investment: a further comment', *Journal of Development Economics*, 45(1):155–63.

——, 1998. 'Aid and macroeconomic performance', in H. White (ed.), *Aid and Macroeconomic Performance*, Palgrave Macmillan, London.

Windmeijer, F., 2005. 'A finite sample correction for the variance of linear efficient two-step GMM estimators', *Journal of Econometrics*, 126(1):25–51.

Windybank, S. and Manning, M., 2003. *Papua New Guinea on the Brink*, Issues Analysis, The Centre for Independent Studies, Sydney.

Wolfers, E., 1981. 'Papua New Guinea in 1980: a change of government, aid, and foreign relations', *Asian Survey*, 21(2):274–84.

Wood, A, 2008. 'Looking ahead optimally in allocating aid', *World Development*, 36(7):1135–51.

Wooldridge, J., 2000. *Introductory Econometrics: A Modern Approach*, South Western College Publishing, USA.

Woolner, D., 1995. *Papua New Guinea: 20 years on*, Research Paper No. 4, Australian Parliament House Library, Canberra.

World Bank, 1977. *Papua New Guinea: its economic situation and prospects for development*, Country Economic Report, World Bank, Washington D.C.

——, 1990. *Structural adjustment loan project: Papua New Guinea*, Project No. P004394, 5 June, World Bank, Washington D.C.

——, 1998. *Assessing aid: what works what doesn't and why*, Policy Research Report, Oxford University Press, Oxford.

——, 1999. *Papua New Guinea: improving governance and performance*, Report No. 19388-PNG, East Asia and Pacific Region Office, Sydney.

——, 2002. *World Bank Group Work in Low-Income Countries under Stress: a taskforce report*, Available from http://siteresources.worldbank.org/INTLICUS/Resources/3887_58-1094226297907/Task_Force_Report.pdf (accessed 20 January 2008).

——, 2004. *Aid effectiveness and innovative financing mechanisms*, Report prepared for the 2004 Annual Meetings of the International Monetary Fund and the World Bank, 2–3 October, Washington D.C.

——, 2005. *Growth in the 1990s: learning from a decade of reform*, World Bank Policy Document, Washington D.C.

——, 2007, 2008a. *World Development Indicators Database.* Available from www.worldbank.org (accessed between 26 April 2007 and 20 December 2008).

——, 2008b. *Strategic directions for human development in PNG*, Report No. 40924, East Asia and Pacific Region Office, Sydney.

Young, L. and Young, K., 1975. 'Estimation of regressions involving logarithmic transformation of zero values in the dependent variable', *The American Statistician*, 29(3):118–20.

Zellner, A., 1962. 'An efficient method of estimating seemingly unrelated regressions and tests for aggregation bias', *Journal of American Statistical Association*, 57(1):348–68.

Zimmermann, V., 1996. *Pseudo-R2 Measures for Some Common Limited Dependent Variable Models*, Sonderforschungsbereich Institute. Available from http://epub.ub.uni-muenchen.de/ (accessed 21 September 2008).